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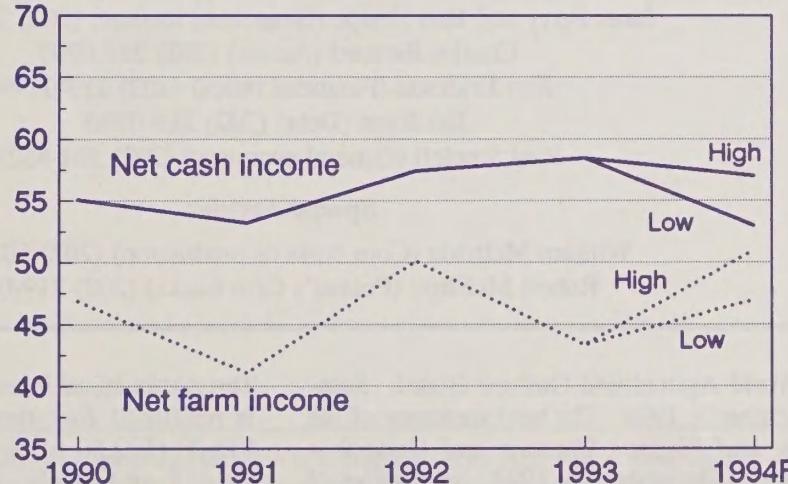
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Agricultural Income and Finance

Situation and Outlook Report

Net Cash Income Expected To Fall in 1994
While Net Farm Income Expected To Increase

Billion \$



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Summary

Net farm income is forecast at \$47-\$51 billion in 1994, up from \$43 billion in 1993. A \$4-\$6 billion inventory buildup will account for a large part of the increase. Net cash income from farming is expected to range between \$53 billion and \$57 billion, compared with an average of \$56 billion during the past 5 years. Average incomes of farm operator households are expected to increase as well.

Gross farm income is forecast to rise in 1994 as receipts from crop and livestock marketings increase. Crop receipts are expected to increase 6-8 percent from 1993 as production climbs from last year's weather-reduced levels. Larger crop production is expected to generate lower prices but boost inventories. Farmers are expected to rebuild inventories that had been drawn down because of weather-related disasters in 1993. Feed grain production is expected to increase 40 percent from 1993 while feed grain receipts may rise 4-6 percent. Soybean production may rise 26 percent, helping generate a forecast 9-11 percent rise in oilseed cash receipts.

Total livestock and dairy receipts are forecast steady to up 2 percent from 1993. Although livestock production is expected to increase, lower prices may lead to steady or lower receipts for cattle and hogs. Receipts from broilers and dairy are forecast to increase.

Government payments are expected to decline substantially from last year's \$13.4 billion. Most of the decline comes from reduced deficiency payments for feed grains, especially corn. Low ending stocks of corn in 1993 kept prices high in the first 6 months of 1994. Disaster payments have contributed to the level of government payments in both 1993 and 1994.

Farm production expenses are expected to rise 2-3 percent during 1994 with most items increasing slightly. Interest expenses will rise as interest rates climb from their low 1993 levels. Rising petroleum prices in the past several months will likely increase expenditures for petroleum-based farm inputs. Increases in planted acres are expected to boost expenditures on inputs associated with crop production. Expenses for purchased livestock may drop due to lower prices for calves and feeder pigs.

The value of farm assets is expected to increase 3-4 percent in 1994, slightly more than the rate of inflation as measured by the GDP price deflator, while farm debt is forecast to increase just over 1 percent. Lenders have sufficient funds to lend, but farm operators remain cautious about acquiring additional farm debt. Farm equity is expected to range between \$771 billion and \$781 billion by the end of 1994. In real terms, farm equity has remained fairly stable since 1985.

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Net Farm Income To Recover in 1994

After falling 13.3 percent in 1993, U.S. net farm income is forecast up 12-14 percent in 1994. Floods and drought reduced crop production last year, while expenses rose 5 percent.

USDA has just released farm income estimates for 1993. Despite weather disasters in the Midwest and Southeast, indications are that crop receipts at the national level fell less than 1 percent, due in large part to sales early in the year of the large 1992/93 carryover and disaster-induced higher crop prices. Livestock receipts rose nearly 5 percent and direct Government payments were up 46 percent. Although farmer surveys reported expenses rose over 5 percent, net cash income reached a record \$58.5 billion. Net farm income, reflecting calendar 1993's lower production, fell 13.3 percent, but was still up from 1991. For more information on 1993 conditions, see the special farm income supplement on page 13.

Strong Crop Sector Expected This Year

USDA's August *Crop Production* report shows 1994 feed grain production forecast up 40 percent from 1993, but down 5 percent from 1992's record. Wheat production is forecast down less than 1 percent, and soybeans up 26 percent to a record level. Prices for most major field crops are expected down, given higher production. On the livestock side, red meat production is forecast up over 3 percent, poultry up 5 percent, and milk up 1-2 percent.

Larger 1994 crop production points to higher receipts for all major crops. If yields and prices hold as currently forecast, food grain receipts could rise 12-16 percent, feed grain re-

ceipts could rise 4-6 percent, and oilseed receipts could rise 9-11 percent. The most dramatic change in crop receipts could occur with cotton as prices climb and production rises, pushing cotton receipts to possible record highs. Overall 1994 crop receipts are forecast at \$88-\$92 billion, up 6-8 percent from last year.

Weak Prices Affecting Livestock Sector

Although livestock production is expected up this year, lower prices are offsetting and will likely lead to lower cash receipts for cattle and hog producers. Red meat receipts are forecast steady to down 2 percent from 1993. Poultry receipts, however, should continue strong. Broilers make up nearly two-thirds of all poultry and egg receipts and this subsector continues to improve. Milk receipts are expected up from the past 3 years. Total livestock and dairy receipts are forecast at \$89-\$93 billion, steady to up 2 percent from last year.

Government Payments Declining in 1994

For 1994, forecasts show total Government payments down 35-40 percent to \$8-\$10 billion, a range more in line with 1992. Much of the big increase in 1993 Government payments was due to increased deficiency payments, primarily for feed grains, brought on by the record 1992 crop. Disaster payments have contributed to the level of Government payments in both 1993 and 1994.

Table 1--Distribution of farms by financial position, 1991-93 1/

Item	Favorable	Marginal income	Marginal solvency	Vulnerable
Percent				
All farms				
1991	63.3	27.0	5.3	4.4
1992	65.5	26.3	4.5	3.8
1993	60.7	28.3	6.1	4.9
Commercial farms 2/				
1991	64.3	18.0	12.1	5.6
1992	68.0	18.0	10.2	3.9
1993	61.2	20.6	12.0	6.3

Source: Farm Costs and Returns Surveys, USDA.

1/ Financial position is based on net farm income and debt-to-asset ratio. Favorable - positive net farm income and debt/asset ratio 0.4 or less; marginal income - negative net farm income and debt/asset ratio 0.4 or less; marginal solvency - positive net farm income and debt/asset ratio greater than 0.4; vulnerable - negative net farm income and debt/asset ratio greater than 0.4. 2/ Commercial farms are farms with reported annual gross sales of agricultural products of \$40,000 or more.

Expenses To Moderate After Large 1993 Increase

Increases in production expenses are forecast to moderate this year to 2-3 percent after rising over 5 percent last year. Lower prices for calves and feeder pigs will lead to a drop in feeder livestock expenses. Other expense categories will probably see slight increases. Rising petroleum prices in the past several months will likely increase expenditures for petroleum-based farm inputs. Increases in planted acres are expected to boost expenditures on crop production inputs. Interest expenses fell last year, but with interest rates rising this year, interest expenses will return to 1992 levels. Feed, labor, and transportation expenses show the largest dollar increases, averaging at least \$500 million each for 1994.

Farm Household Well-Being Slowly Improving

As many analysts have stressed, the financial well-being of farm and ranch households depends to a large extent on the operation's dependence on farming for household income. The majority of U.S. farm operator households depend on off-farm employment for most of the household's income. These households have generally seen rising incomes as non-farm wages rise. The variability in farm income has little effect on these people. The relatively small number of farm operator households that depend mainly on farm sales for household income have more variation in their income. Last

year's heavy rains, floods, and drought severely hurt families in the affected areas as most income had to come from whatever off-farm income was available. The more these households depended on crops as opposed to livestock, the more they were affected. On the other hand, farm-dependent households outside the disaster areas saw higher incomes due to higher disaster-induced crop prices. Average incomes of farm operator households are expected to be up slightly in 1994 from last year.

Survey Verifies Weaker '93 Conditions

USDA's Farm Costs and Returns Survey shows that for 1993, the financial positions of U.S. farms and ranches weakened from 1992 (table 1). Among commercial farms (those with annual gross agricultural sales of at least \$40,000) the share of operations classified as financially favorable (positive net farm income and debt/asset ratio less than 0.4) fell to 61.2 percent from 68.0 percent in 1992. At the other extreme, the percent classified as financially vulnerable (negative net farm income and debt/asset ratio greater than 0.4) rose to 6.3 percent from 1992's 3.9 percent. Similar patterns of declines in favorable operations were evident across the major production regions. Because this classification system is based on net farm income, the reduced 1993 production heavily influenced the financial categorization of farms.

Figure 1
Major Crop Receipts Strong

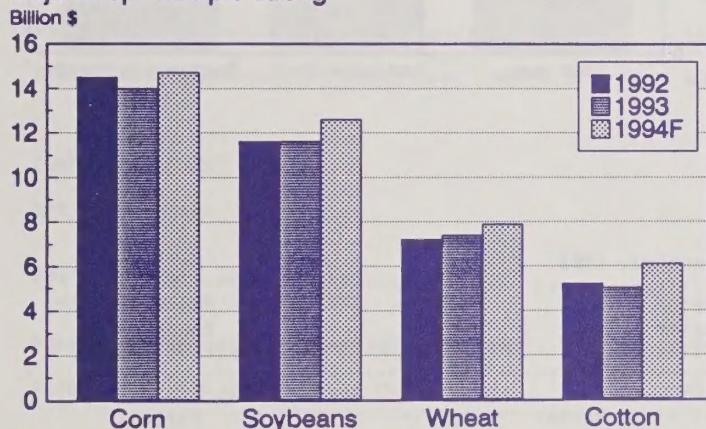


Figure 2
Livestock Receipts May Rise

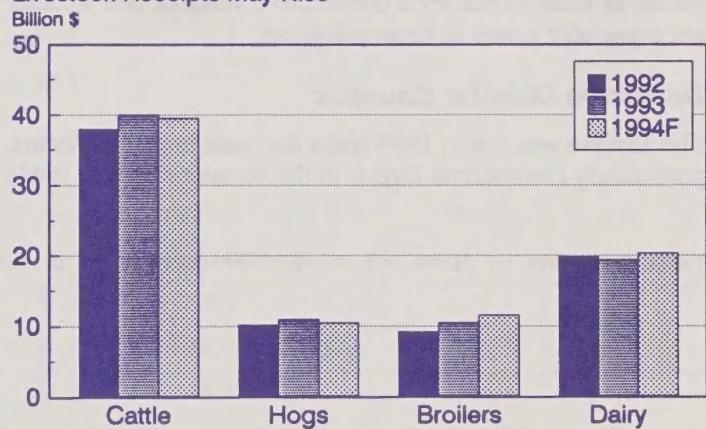


Figure 3
Direct Government Payment Components

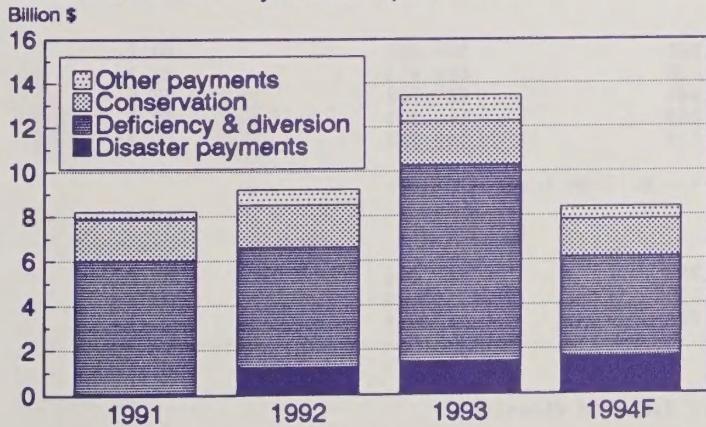
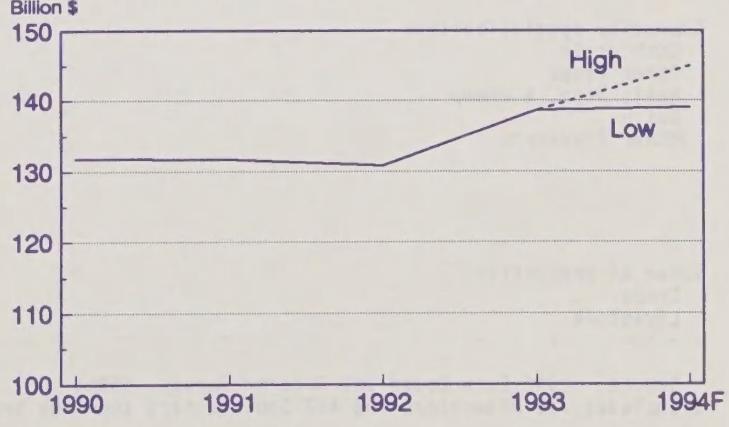


Figure 4
Farm Production Expenses



Midwest Recovering from 1993's Heavy Rains

Farm incomes are expected to improve the most in the Midwest in 1994. Net farm incomes fell an average 29 percent in disaster counties in 1993.

With harvest underway in many parts of the country, 1994 is shaping up to be a very good year for many U.S. farmers and ranchers. Crop receipts are forecast up in all major regions except the Northeast and livestock receipts are forecast up everywhere except the West. The Midwest is expected to show the greatest income improvement in 1994, largely because it was the region most affected by last year's poor weather conditions. The Midwest is the largest producer of food and feed grains and typically accounts for nearly one-third of U.S. net farm income and net cash income from farming.

As of early August, this year has been less disaster-prone than last. However, torrential rains, high winds, tornados, and flooding associated with tropical storm Alberto hit portions of Georgia, Florida, and Alabama in early July. Virtually all of the counties designated as disaster areas because of Alberto were also disaster areas because of the drought last year. Farms in areas struck by 2 consecutive years of bad weather are especially prone to financial stress.

Update on Disaster Counties

The adverse weather in 1993 had a dramatic impact on farms, particularly commercial farms, in the disaster counties (table

2). Farmers in the Midwest and Southeast experienced declining net farm incomes, and deteriorating financial position. Government disaster payments covered part of the losses. For commercial farms in the disaster areas, average net farm

Figure 5
Number of Farms
in Selected Disaster Counties, 1992

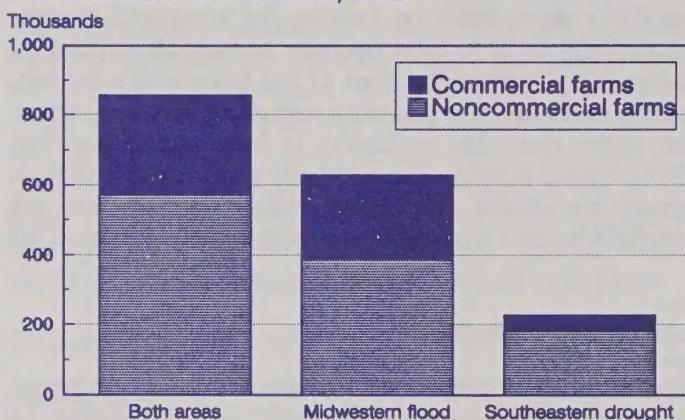


Table 2--Number of farms and value of production for disaster counties, 1992

Item	Selected disaster counties 1/	U.S. total	Disaster counties' share of total
		Number	Percent
All farms	857,513	2,090,700	41.0
Sales class:			
Less than \$50,000	569,997	1,533,087	37.2
\$50,000 or more (commercial)	287,516	557,613	51.6
Commodity specialization:			
Cash grain	237,060	390,607	60.7
Other crops	158,228	489,915	32.3
Beef, hogs, & sheep	345,444	921,702	37.5
Dairy	74,068	140,201	52.8
Other livestock	42,714	148,274	28.2
----- Million dollars -----			
Value of production			
Crops	59,784	143,545	41.6
Livestock	27,123	70,490	38.5
	32,661	73,056	44.7

Source: 1992 Farm Costs and Returns Survey, USDA.

1/Includes 739 Midwestern and 497 Southeastern counties that were declared disaster.

income fell about \$11,000 between 1992 and 1993. Increased disaster payments appeared in the share of commercial farms' gross cash income from Government payments. Fewer commercial farms were in the favorable financial category in 1993 than in 1992, and the share of commercial farms with a low debt/asset ratio declined by about 12 percentage points.

The 1993 disaster counties are normally very important to U.S. agriculture (table 3). In 1992, the year before the bad weather, these counties contained 41 percent of U.S. farms, 52 percent of commercial farms, and 61 percent of cash-grain farms. About 42 percent of the 1992 U.S. value of agricultural production occurred in these disaster counties.

The effects of the adverse weather extended beyond the farm to local communities. About 36 percent of the disaster coun-

ties in the Midwest were also farming-dependent counties, where at least 20 percent of earned income comes from farming. This region is particularly important because almost half of all U.S. farming-dependent counties were also Midwestern disaster counties. A much smaller share of the Southeastern counties (6 percent) was farming-dependent.

Farm Numbers Continue Falling

The number of U.S. farms and ranches fell 1 percent last year, leaving 2.04 million in operation. Most of these losses were in small farms with gross sales under \$10,000 (down from 992,600 farms to 976,810). The number of large commercial operations, those with sales over \$100,000, rose from 339,500 to 342,700. Land in farming also fell, down 2.9 million acres from last year to 974.8 million acres.

Table 3--Farm financial characteristics in selected disaster counties, 1992 and 1993

	Midwestern flood counties		Southeastern drought counties		Both areas	
	1992	1993	1992	1993	1992	1993
Dollars per farm						
ALL FARMS						
Percent						
Net farm income	15,538	11,155	11,773	7,837	14,537	10,290
Gov't payments as a percent of gross cash farm income	6.3	10.2	3.4	5.7	5.8	9.4
Farms in a favorable financial position 1/	66.4	58.6	75.9	64.4	69.0	60.1
Farms with debt/asset ratio no more than 0.1	58.2	50.9	79.3	77.6	63.9	57.8
Dollars per farm						
COMMERCIAL FARMS						
Net farm income	35,191	24,408	40,774	29,848	36,080	25,216
Gov't payments as a percent of gross cash farm income	5.4	9.1	2.9	5.5	5.0	8.6
Farms in a favorable financial position 1/	70.1	59.7	74.1	65.0	70.7	60.5
Farms with debt/asset ratio 0.1 or less	44.0	31.8	59.0	51.0	46.4	34.7

Source: Farm Costs and Returns Surveys, USDA.

1/ Positive net farm income and debt/asset ratio 0.4 or less.

Figure 6
Disaster Counties Associated with Tropical Storm Alberto

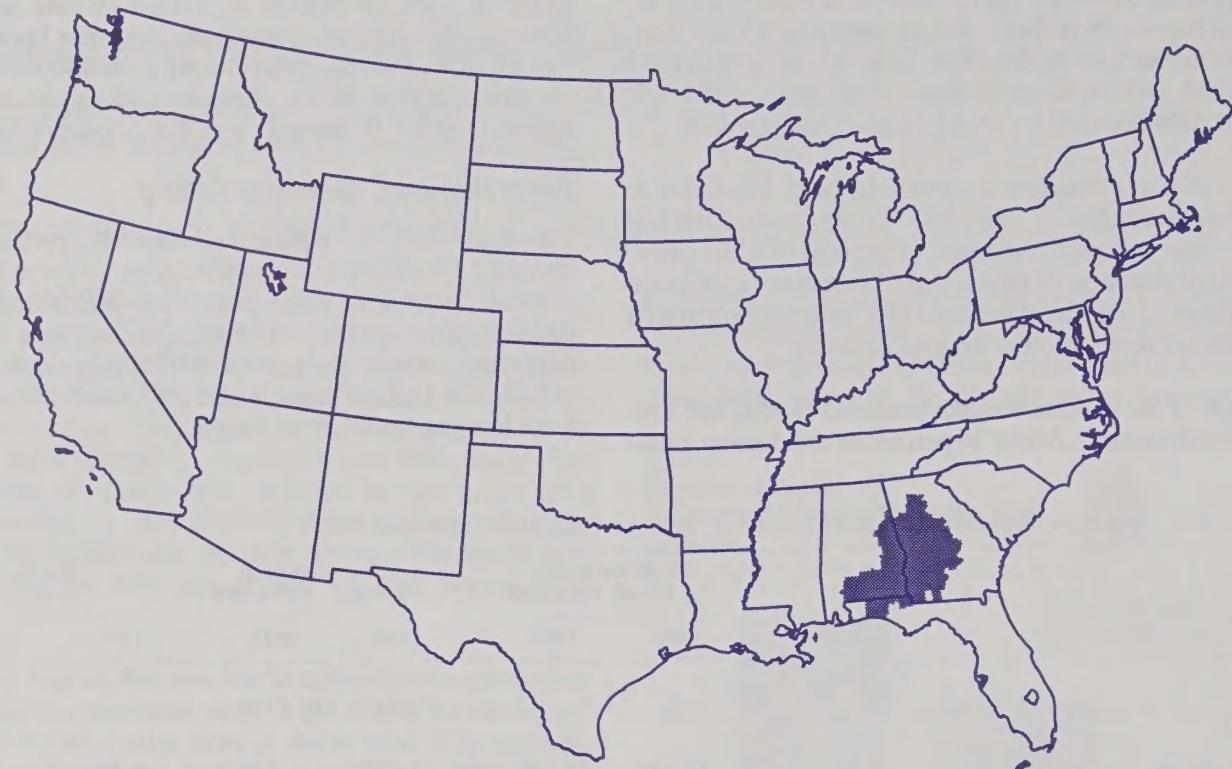
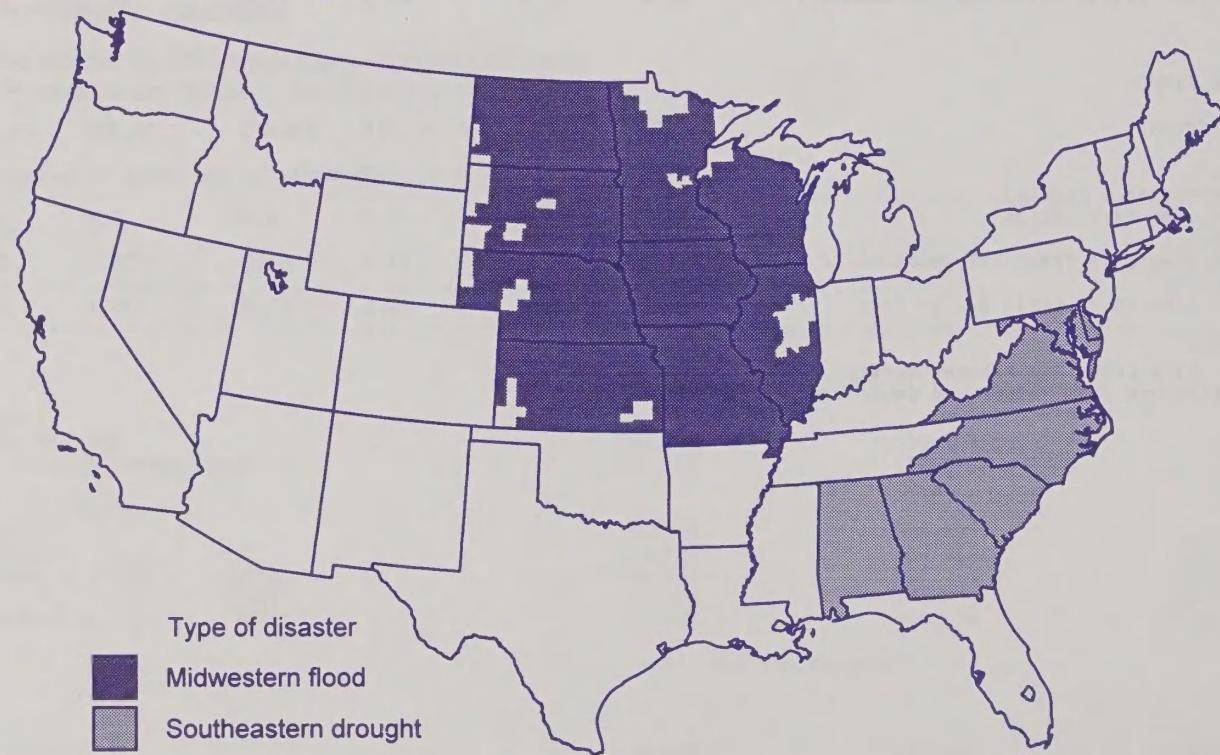


Figure 7
Two Disaster Regions, 1993



Source: U.S. Department of Agriculture, Farmers Home Administration.

Growth in Farm Equity Continues in 1993-94

Asset values are expected to rise 3 to 4 percent in 1994. Because farm debt is forecast to increase about 1 percent, farm equity is expected to rise.

Total 1994 farm asset values are expected to increase 3 to 4 percent. If the current inflation rate continues during 1994, the real value of farm assets will increase for the second consecutive year. A similar rate of increase in farm real estate accounts for most of the projected increase in farm asset values. Yearend inventory values for livestock and poultry, machinery and equipment, crops, purchased inputs, and farm financial assets are expected to exceed beginning-year values. At the end of 1994, the value of U.S. farm business assets is expected to exceed \$915 billion.

Changes in aggregate asset values forecast for 1994 are slightly larger than those estimated for 1993. The value of U.S. farm assets increased 3 percent during 1993, from \$861.2 billion on January 1 to \$888 billion on December 31. Farm real estate accounted for 92 percent of the increase. During 1993, nine out of 10 farm production regions experienced increases in the value of farm real estate. The largest increases were in the Mountain States and Northern Plains, followed by the Corn Belt and Northeast.

Debt To Rise Slightly

Farm business debt is forecast to rise about 1 percent in 1994. Preliminary data indicate that farm debt increased about 2 percent in 1993. When Farmers Home Administration (FmHA) direct lending activity is excluded, farm debt increased about 3.5 percent in 1993. These increases maintain the recent trend of modest growth in farm debt.

The continuing recovery of the agricultural economy and the impacts of the floods and drought in 1993 have not produced a significant rise in loan demand. The rise in net cash income in 1993, and the expectations of favorable earnings in 1994 suggest that farmers may have adequate cash to meet their needs with little additional borrowing.

Credit Availability

The abnormal weather of 1993 has primarily affected the seasonal pattern of farmers' use of credit, rather than the level of outstanding loan balances. Anecdotal evidence indicates that farmers were borrowing later in the year, and lenders were more willing to offer extensions and renewals to those experiencing weather-related repayment difficulties.

Farmers' debt to commercial banks increased 5.7 percent in 1993, about the same rate as in 1990 and 1991. Bank debt of farmers increased over 12 percent in North Carolina, about 9 percent in the Dakotas, and almost 8 percent in Iowa, the only States in flood and drought areas to report increases greater than the national average. While weather conditions

may have adversely affected local areas, these data suggest that average statewide impacts did not result in a surge in new loan placements.

Although farmers should receive relatively favorable net cash income in 1994, those operating on tight margins may find it more difficult to obtain operating credit from traditional sources, especially if they were financially stressed in 1993. The reduction in FmHA direct lending means that marginal operations have fewer credit alternatives. Input suppliers may be partially filling this credit void by offering favorable financing terms to purchasers.

Otherwise, lenders generally have reported ample funds to meet the expected 1994 borrowing needs of credit-worthy customers. While stable to rising land values have at least

Table 4--Farm business equity in nominal and real dollars, December 31, 1970-93

Year	Current dollars	1987 dollars 1/
		Billion dollars
1970	229.9	653.1
1971	248.3	669.3
1972	281.0	724.2
1973	350.7	849.2
1974	373.3	831.4
1975	425.7	865.2
1976	494.7	945.9
1977	540.7	967.3
1978	639.9	1,061.2
1979	746.6	1,139.8
1980	816.4	1,138.6
1981	799.9	1,013.8
1982	755.7	901.8
1983	752.2	862.6
1984	663.3	728.9
1985	595.1	630.4
1986	567.5	585.7
1987	628.2	628.2
1988	661.7	636.9
1989	692.4	638.2
1990	710.9	627.4
1991	703.5	597.7
1992	722.9	596.9
1993	744	600
1994F	771 to 781	605 to 615

F = forecast. 1/ Deflated by the GDP implicit price deflator.

partially restored lender confidence in the security of loans collateralized by farmland mortgages, lenders' increasing emphasis on borrowers' ability to meet debt service requirements from current cash flows has created a more restrictive definition of credit-worthiness.

Lenders' Shares of Farm Loans Change

Bank and FCS shares of farm lending are expected to increase in 1994, as their combined share exceeds 63 percent. Commercial banks surpassed the FCS as the principal lender to agriculture in 1987. Commercial banks' share of farm lending increased from 22 percent in 1982 to over 38 percent by the end of 1993. Banks' share of real estate debt rose from less

than 8 percent in 1982 to almost 26 percent in 1993. The FCS' market share stabilized at about 25 percent during 1988-93, after falling from 34 percent in 1982.

Real Value of Farm Equity Stable

In nominal dollars, over \$210 billion of farm equity loss will have been recovered by the end of 1994 from the \$250 billion loss that occurred from the peak of 1980 to the end of 1986 (table 4). However, in real dollars, the value of farm equity has remained fairly stable since the end of 1984, reflecting stability of real net cash income from farming during 1985-94.

Economic Growth Continued Strong in First Half of 1994

The replenishment of inventories that had been drawn down by the strong growth in consumer and business equipment spending in late 1993 boosted first half economic growth. Economic growth is expected to slow slightly in the second half of 1994.

The economic recovery remained moderately strong through the second quarter. Real GDP's growth of \$91 billion from the fourth quarter of 1993 translated into an annual growth rate of 3.5 percent for the first half of 1994. The recovery currently continues to be fueled by strong real business fixed and residential investment (up \$32 billion and \$9 billion respectively in the first half of 1994 from the 4th quarter of 1993) and the willingness of consumers to maintain high levels of current consumption by maintaining a low savings rate out of personal disposable income. Growth in real non-farm business inventories was the largest single contributor to first half GDP growth. Nonfarm business inventories increased over \$39 billion in the first half of 1994 and contributed nearly 45 percent to overall GDP growth. Strong growth in residential housing of over \$9.0 billion occurred despite higher mortgage rates.

Economic growth would have been stronger in the first half of 1994 if the growth has not been limited by the deterioration in net exports and reduced Federal Government spending. Real net exports were down \$31 billion and Federal Government spending was down \$14 billion. The rate of domestic economic growth is expected to decline slightly in the second half of 1994 due to higher interest rates, large business inventory accumulation in the first half, the likelihood that the consumer savings rate will not continue to fall, and less slack in labor and capital markets to support higher output. Stronger world growth through its positive impact on U.S. exports should moderate any slowdown in U.S. domestic growth. A slightly slower pace of domestic economic growth and strong foreign competition spurred by continued moderate excess capacity abroad should keep any increase in inflation small.

Strong Growth in Business Investment Leads Economic Recovery

In the first half of 1994, real business fixed investment expanded at an annual rate of 12.1 percent with durable equipment expanding 14.5 percent while spending on business structures increased 5.0 percent. Business fixed investment was a percentage of GDP fell in the 1980's because of high real interest rates that reflected a declining personal saving rate (which limited the pool of domestic saving), a growing government structural deficit, and relatively tight monetary policy.

In the 1990's the share of GDP accounted for by business fixed investment has expanded due to lower real interest rates and rising capacity utilization. Lower real interest rates have been produced by an easier monetary policy, prospective

smaller government deficits over time, weaker foreign credit demand, and strong growth in corporate profits (which reduces the need for outside funds to finance investment). Rising capacity utilization necessitates the need for greater investment spending to meet long-term capacity needs. Real business fixed investment is expected to remain strong in the second half of 1994 and into 1995.

Nonfarm business inventories increased \$39 billion in the first half of 1994. The large increase in inventories was due to the strong growth in consumer and business equipment spending in the fourth quarter of 1993 that pushed business inventories below desired levels. Most of the increase was in durable goods inventories. Growth in business inventories is expected to slow in the second half of 1994.

Consumption Spending Expanded Moderately

Growth in consumption spending in the first half was more moderate, reflecting slower gains in real personal disposable income and consumer reluctance to significantly reduce an already low savings rate. In the first half of 1994, strong employment gains generated a moderate 3.1-percent annualized gain in real disposable income, which coupled with a slight fall in the savings rate, generated a 3.0-percent increase in consumption spending. Consumption spending was held down by higher tax and interest payments. Increased use of consumer credit fueled part of the expansion of consumption spending in the first half of 1994, especially for consumer durables.

Net Export Situation Continues To Deteriorate

The U.S. trade deficit as measured by net exports of goods and services fell an additional \$31 billion in the first half of 1994 relative to the fourth quarter of 1993. Net exports are expected to continue to deteriorate for the remainder of 1994 and most of 1995. However, the rate of deterioration should slow sharply for two primary reasons.

First the differential between U.S. and world economic growth is expected to narrow. The U.S. economic recovery has led the world recovery. Economic growth for most of Europe and Japan is increasing while growth in the United States is expected to fall slightly for the remainder of 1994 and 1995. Therefore, foreign demand for U.S. exports should be growing relatively more rapidly than the U.S. demand for imports due to more rapid foreign income growth. Second, the trade-weighted value of the U.S. dollar, in real terms, has declined 6.5 percent through July 1994 after increasing 5.8 percent in 1993 and 6.1 percent in 1992. The fall in the real value of

the dollar improves the competitive position of U.S.-produced products both domestically and abroad by making U.S. exports relatively cheaper abroad and foreign exports relatively more expensive in the U.S.

However, the full effect of the recent real depreciation in the dollar on real net U.S. exports will be felt with a minimum lag of two to three years. The lag occurs because neither prices or quantities demanded of U.S. imports and exports adjust fully to the depreciation in the short-run. U.S. exporters may raise the dollar price of U.S. exports shipped abroad to raise their short-term profit margins, thus partially offsetting the impact of the fall in the dollar on the price of U.S. exports abroad. Likewise, in response to the depreciation of the dollar, foreign exporters that desire to maintain market share may temporarily cut their profit margins to help stabilize the dollar price of their exports to the United States. Therefore, the foreign currency price of U.S. exports abroad typically will not fall nor the dollar price of foreign exports rise by the full percentage depreciation in the value of the dollar, especially in the short-run.

In response to changes in the relative prices of domestic and foreign goods, the quantities of real exports and imports demanded will respond with a lag as well. A change in the level of the exchange rate that persists over time creates greater incentives for consumers and producers to alter their consumption and production choices between domestic and foreign consumer and business capital goods.

Real Economic Growth May Slow

Economic growth is expected to slow slightly in the second half of 1994 or in early 1995. The primary factors likely to slow economic growth are higher interest rates, recent unsustainable high business inventory accumulation, an unwillingness of consumers to significantly lower an already low savings rate, and less slack in resource markets to support higher output. Slightly slower economic activity will reduce the threat of future higher inflation or real interest rate pressures on the economic recovery.

Since the beginning of the year, rising business and consumer demand for credit and a tightening of monetary policy have significantly raised nominal and real interest rates. For example, since the beginning of the year through late August, the prime rate and the average fixed conventional mortgage rate has risen from 6.00 and 7.13 percent, respectively, to 7.75 and 8.54 percent. Higher mortgage rates have slowed growth in the interest-sensitive residential construction area as shown by the second quarter fall in new home sales and the slower growth in single family housing starts.

Expansion of nonfarm business inventories is expected to slow somewhat from the \$39 billion-increase in the first half of 1994. Business firms increased inventories in the first half to restock those that were depleted by the stronger than anticipated fourth-quarter final sales. Moreover, some significant portion of the increase in inventories appeared to be in the area of imported goods as evidenced by the large increase in imports of capital goods and higher imported auto inventories in the first half of 1994. However, with significantly slower final sales in the second quarter, a slowdown in planned production to increase inventories is likely.

The expansion is not likely to get an appreciable boost from a significant fall in the already historically low personal savings rate. The second-quarter savings rate of 4.0 percent is far below the 1980's average of 6.6 percent. Moreover, consumer debt is beginning to rise. Most of the decline in consumer debt that occurred in the 1990's reflected lower interest rates rather than a retrenchment in the use of consumer debt relative to consumer disposable income. The 13.5 percent-annualized growth in consumer installment credit in the first half of 1994 coupled with rising interest rates on mortgage and installment credit indicates that consumer debt payments are beginning to rise relative to disposable personal income.

Finally, as the rate of employment and capacity utilization increases, fewer highly productive underemployed resources are available. With less slack in labor and capital markets, output cannot expand as easily. Thus, higher demand for goods and services is not as easily met by low cost increases in output. The result is a combination of slower product deliveries and or higher inflation. Strong foreign competition is expected to keep any increase in inflation small in 1994 and 1995.

Implications for Agriculture And Rural America

Agriculture and rural America should benefit from the continued moderate recovery with low inflation. Rural manufacturing industries, such as specialized capital goods producers, as well as agriculture with well-developed foreign markets should especially benefit from stronger world growth and the fall in the dollar in 1994. Capital goods sales tend to be move strongly with the general business cycle. Therefore, rural America's specialized capital goods manufacturer with well-developed foreign markets should prosper from the stronger world recovery and more favorable foreign exchange rates. Although short-term borrowing rates to rural America are expected to rise at least for the remainder of the year, increases are expected to be only 75 basis points. Increases in long-term lending rates to rural American firms are expected to be significantly less than short-term borrowing rates.

USDA Releases First Estimates of 1993 Farm Income

Net farm income fell 13.3 percent in 1993 reflecting the reduction in agricultural production caused by heavy rains, flooding, and drought that occurred during the year. Net cash income increased 2 percent.

Net farm income, which measures net value of agricultural production that occurred during a calendar year, declined 13.3 percent in 1993 to \$43.4 billion. (See table 5). Gross farm income was up a modest 0.6 percent to \$201.4 billion. Cash receipts from farm marketings rose \$3.8 billion, with a \$4.2-billion increase in livestock receipts partially offset by a \$400-million drop in crop receipts. While crop production fell in 1993, crop sales dropped only slightly due primarily to the \$4.3 billion of crop sales from inventories. Crop producers received \$4.2 billion more in direct Government payments, partly due to disaster related aid. Cattle and poultry producers both had considerable gains in sales.

Regional weather conditions contributed to the 13-percent decline in net farm income for 1993. Some decline in net farm income for 1993 had been expected, given the near perfect weather in 1992 that resulted in record high crop yields. In 1993, heavy rains and extensive flooding in the upper portion of the Mississippi River and its principal tributaries in late spring and early summer destroyed planted crops and precluded production on much of the flooded land. A severe drought in the Southeast also limited yields. Per acre yields retreated considerably from their 1992 highs. The average U.S. corn yield of 101 bushels per acre in 1993 was down more than 30 bushels from the 1992 record. Soybean yields averaged 32 bushels per acre, down 15 percent.

Corn, an important crop and one that is sensitive to weather conditions, serves as a barometer of crop production for the agricultural sector. Thus, in a year when the corn harvest is down by a third, net farm income can be expected to follow suit with some offset for rising prices. The value of inventory adjustment is added to cash receipts to reflect the value of commodity production for the calendar year. The addition of inventory adjustment to cash receipts essentially subtracts the value of commodities produced in the prior year but sold in the current year from cash receipts and adds the value of unsold and unused commodities produced during the current year.

Production expenses were up \$7.9 billion in 1993 after having remained essentially unchanged for 3 consecutive years. After dropping in 1992, beef, hog, and sheep prices recovered in 1993 with the increase filtering down to market prices for feeder and replacement animals. Improving market conditions for livestock increased demand for feed, as drought in livestock producing States and floods in the Corn Belt pushed feed prices up. The consequence was a large increase in purchased feed costs as farmers purchased a higher percentage of grain than usual because of reduced feed grain production. Producers may have also purchased more feed in August-Oc-

U.S and State Data Now Available

The first release of the 1993 U.S. and State farm income estimates is now available. Previously, only forecasts at the national and regional levels have been available. Calendar year data that are required for the farm income accounts can only be collected following the end of the year. Much of the critical annual data for the major commodities and expenses become available in April through June. Some of the data used in computing farm income estimates are available periodically rather than annually. For instance, some State components are computed using Agricultural Census data, which are available at 5-year intervals.

Current farm income estimates reflect national and regional data from USDA's annual Farm Costs and Returns Survey, and State data from the 1987 Census of Agriculture and from the Agricultural Economics and Land Ownership Survey, a follow-on survey to the Census conducted in 1988. The 1993 farm income estimates will be revised over several years as additional data become available. The 1992 Census of Agriculture data will be available in late 1994 and will be incorporated in the next year's State estimates for 1988-95.

tober than needed for current production, anticipating the price increases in the following months and the first part of 1994.

Miscellaneous expenses, such as livestock services and supplies, utilities, and marketing, storage and transportation, showed substantial increases. The increase in utility expenses was mainly for water, particularly in the West, where prices charged farmers rose significantly.

Net Value Added Declined in 1993

Net value added by the agricultural sector to the national economy measures the net income generated from all resources used in agricultural production. These resources include labor, financial capital, and farm physical assets. Net farm income is the earnings accruing to farm operators for use of their resources. Other contributors toward the net value added by the farm sector include lenders, who receive interest payments; employees, who are paid for their labor; and landlords, who receive net rental payments for their contributions. Net value added in 1993 was \$79.9 billion, down \$6.0 billion

Table 5--Net farm income, net value added, and net cash income, current and deflator dollars, 1950-93

Year	Current dollars			GDP deflator	Deflated dollars		
	Net farm income	Value added	Cash income		Farm income	Value added	Cash income
	Million dollars			1987-100	Million dollars		
1950	13,648	18,290	12,727	20.2	67,564	90,546	63,005
1951	15,934	20,915	14,790	21.3	74,808	98,193	69,437
1952	14,961	20,009	14,248	21.5	69,586	93,066	66,270
1953	12,980	17,707	14,111	22.0	59,000	80,487	64,141
1954	12,373	16,919	12,776	22.2	55,734	76,213	57,550
1955	11,305	15,821	12,176	22.9	49,367	69,089	53,170
1956	11,255	15,917	12,911	23.6	47,691	67,443	54,708
1957	11,085	15,829	11,925	24.4	45,430	64,874	48,873
1958	13,168	18,256	13,822	24.9	52,884	73,319	55,510
1959	10,714	15,606	12,518	25.6	41,852	60,961	48,898
1960	11,211	16,429	12,804	26.0	43,119	63,188	49,246
1961	11,956	17,581	13,663	26.3	45,460	66,848	51,951
1962	12,065	18,052	13,697	26.9	44,851	67,108	50,918
1963	11,770	18,194	13,565	27.2	43,272	66,890	49,871
1964	10,492	17,187	13,958	27.7	37,877	62,047	50,390
1965	12,900	20,100	14,680	28.4	45,423	70,775	51,690
1966	13,961	21,594	17,058	29.4	47,486	73,449	58,020
1967	12,339	20,155	15,057	30.3	40,723	66,518	49,693
1968	12,322	20,599	15,913	31.8	38,748	64,777	50,041
1969	14,293	23,101	18,148	33.4	42,793	69,165	54,335
1970	14,366	23,704	18,373	35.2	40,813	67,341	52,196
1971	15,012	24,527	18,037	37.1	40,464	66,111	48,617
1972	19,456	30,431	23,169	38.8	50,144	78,430	59,714
1973	34,357	48,447	35,960	41.3	83,189	117,305	87,070
1974	27,266	42,538	34,810	44.9	60,726	94,739	77,528
1975	25,547	41,879	29,589	49.2	51,925	85,120	60,140
1976	20,176	37,743	29,921	52.3	38,577	72,166	57,210
1977	19,882	38,957	27,865	55.9	35,567	69,691	49,848
1978	25,197	46,755	33,128	60.3	41,786	77,537	54,939
1979	27,416	54,649	33,414	65.5	41,856	83,434	51,014
1980	16,133	46,741	34,199	71.7	22,501	65,190	47,697
1981	26,879	60,875	32,780	78.9	34,067	77,155	41,546
1982	23,841	59,423	38,099	83.8	28,450	70,911	45,464
1983	14,247	48,955	38,353	87.2	16,338	56,141	43,983
1984	26,104	63,676	37,432	91.0	28,686	69,974	41,134
1985	28,768	63,600	47,139	94.4	30,475	67,373	49,935
1986	31,052	62,096	47,899	96.9	32,045	64,083	49,431
1987	39,721	70,487	55,755	100.0	39,721	70,487	55,755
1988	38,028	69,776	53,868	103.9	36,601	67,157	51,846
1989	47,895	81,179	54,204	108.5	44,143	74,820	49,958
1990	46,911	81,874	55,071	113.3	41,404	72,263	48,606
1991	41,109	74,479	53,179	117.7	34,927	63,279	45,182
1992	50,073	82,953	57,389	121.1	41,348	68,500	47,390
1993	43,401	76,934	58,518	124.2	34,944	61,944	47,116

from 1992. Net farm income fell \$6.7 billion, which is more than the drop in the net value added by the agricultural sector, because higher expenditures for labor were only partially offset by lower interest expenses. Rental payments to nonoperator landlords remain about the same. Therefore, farm operators bore the brunt of reduced agricultural production in 1993, but they also received the benefits of the high levels of agricultural production in 1992.

Record Net Cash Income

In contrast to net farm income, net cash income from farming increased to \$58.5 billion in 1993, up 2 percent from 1992's previous record. A \$9.1-billion (4.8 percent) gain in gross cash income was mostly offset by a \$7.9-billion (6.1 percent) rise in cash expenses. Net cash income remains within the \$53-\$58 billion range where it has been for 6 years.

The rise in cash income was due almost entirely to higher receipts from the sale of cattle and poultry and higher Government payments. The relative stability in crop sales came about because farmers offset lower production with sales from inventories. Many farmers manage their business activities to ensure stability in their cash flows. The rise in production expenses was largely offset by additional cash income arising from sales from beginning-year inventories and receipt of disaster-related Government payments.

The irony of the 1993 flood/drought is that although many farmers directly affected had much lower net cash incomes, those outside the affected regions benefited from higher prices and higher incomes. As a result, U.S. net cash farm income for 1993 experienced a modest increase from the record set in 1992. Farmers with production and/or beginning stocks sold crops at the higher prices.

Table 6--Ranking of States by net farm income total, per farming operation, and per acre, 1993

Rank	Total		Per operation		Per acre	
	State	Value	State	Value	State	Value
		\$1,000		Dollars		Dollars
1	CALIFORNIA	5,234,824	ARIZONA	80,729	RHODE ISLAND	641
2	TEXAS	4,097,965	CALIFORNIA	68,879	CONNECTICUT	540
3	NORTH CAROLINA	2,489,450	RHODE ISLAND	57,713	MASSACHUSETTS	299
4	FLORIDA	2,223,713	FLORIDA	57,018	NEW JERSEY	278
5	NEBRASKA	2,092,224	CONNECTICUT	56,858	NORTH CAROLINA	265
6	KANSAS	1,622,897	IDAHO	52,295	FLORIDA	216
7	WASHINGTON	1,572,202	WASHINGTON	43,672	DELAWARE	194
8	GEORGIA	1,532,227	DELAWARE	42,740	CALIFORNIA	176
9	ILLINOIS	1,342,175	NORTH CAROLINA	42,194	MARYLAND	142
10	OKLAHOMA	1,249,649	NEW MEXICO	41,873	GEORGIA	127
11	OHIO	1,183,171	COLORADO	39,063	NEW HAMPSHIRE	125
12	SOUTH DAKOTA	1,178,661	NEBRASKA	38,040	MAINE	112
13	KENTUCKY	1,134,790	SOUTH DAKOTA	34,164	ALABAMA	109
14	ALABAMA	1,093,054	GEORGIA	34,049	PENNSYLVANIA	103
15	IDAHO	1,072,056	NEVADA	33,500	WASHINGTON	98
16	ARKANSAS	1,051,277	MONTANA	32,129	KENTUCKY	80
17	COLORADO	996,105	MASSACHUSETTS	29,401	IDAHO	79
18	OREGON	904,882	NEW JERSEY	28,805	OHIO	78
19	INDIANA	831,538	WYOMING	28,487	VERMONT	78
20	PENNSYLVANIA	816,393	KANSAS	24,968	ARKANSAS	68
21	MONTANA	764,675	OREGON	24,130	NEW YORK	60
22	NORTH DAKOTA	689,859	ALABAMA	23,256	MICHIGAN	58
23	ARIZONA	637,758	ARKANSAS	22,854	SOUTH CAROLINA	56
24	MICHIGAN	624,104	MAINE	22,710	VIRGINIA	54
25	NEW MEXICO	565,282	UTAH	22,358	INDIANA	52
26	MISSOURI	563,951	TEXAS	22,151	OREGON	52
27	TENNESSEE	549,394	NEW HAMPSHIRE	21,325	ILLINOIS	47
28	NEW YORK	493,835	NORTH DAKOTA	21,226	NEBRASKA	44
29	WISCONSIN	473,505	MARYLAND	20,831	TENNESSEE	44
30	VIRGINIA	465,093	OKLAHOMA	17,726	LOUISIANA	39
31	IOWA	462,244	VERMONT	17,588	OKLAHOMA	37
32	MISSISSIPPI	367,873	ILLINOIS	16,990	KANSAS	34
33	LOUISIANA	334,683	PENNSYLVANIA	16,008	TEXAS	32
34	MARYLAND	312,470	OHIO	15,568	COLORADO	30
35	UTAH	290,648	ALASKA	13,398	MISSISSIPPI	29
36	SOUTH CAROLINA	287,950	INDIANA	13,199	WEST VIRGINIA	28
37	WYOMING	262,078	NEW YORK	12,996	WISCONSIN	28
38	NEW JERSEY	241,962	KENTUCKY	12,470	SOUTH DAKOTA	27
39	CONNECTICUT	216,062	MICHIGAN	12,002	UTAH	26
40	MINNESOTA	192,623	SOUTH CAROLINA	11,850	MISSOURI	19
41	MASSACHUSETTS	191,107	LOUISIANA	11,541	ARIZONA	18
42	MAINE	154,429	VIRGINIA	10,816	NORTH DAKOTA	17
43	VERMONT	114,319	MISSISSIPPI	9,433	HAWAII	17
44	DELAWARE	106,851	HAWAII	6,566	IOWA	14
45	WEST VIRGINIA	104,894	TENNESSEE	6,388	NEW MEXICO	13
46	NEVADA	80,399	WISCONSIN	5,994	MONTANA	13
47	NEW HAMPSHIRE	57,577	MISSOURI	5,320	NEVADA	9
48	RHODE ISLAND	40,399	WEST VIRGINIA	5,245	ALASKA	8
49	HAWAII	28,891	IOWA	4,622	WYOMING	8
50	ALASKA	7,101	MINNESOTA	2,214	MINNESOTA	6
	UNITED STATES	43,401,269	UNITED STATES	21,018	UNITED STATES	44

While net cash income is not a direct measure of production, the amount and source of revenue are nevertheless influenced by production levels. Net cash income represents earnings that are available for principal repayment, capital purchases, and family living expenses. When droughts occur in nonconsecutive years, farmers generally have enough inventory that can be used to stabilize their cash income to balance variabilities in production levels that are reflected in net farm income. Payments from insurance and a variety of Government-related disaster programs also help to offset the loss of revenue associated with the heavy rains, floods, and drought in 1993.

California and Texas Lead in Income

The top 10 States accounted for \$23.5 billion, or 54 percent of net farm income, as compared with 51 percent in 1992. See table 6. California and Texas with \$5.2 billion and \$4.1 billion, respectively, were again the top two States in net farm income in 1993, following a small earnings drop in California and a notable gain in Texas. Three additional States had net incomes of at least \$2 billion, including North Carolina (the third-ranking State), Florida, and Nebraska. Iowa, which is usually a top 10 member, dropped to 31st place when its net farm income plummeted to \$462 million due to the floods. Iowa's corn and soybean yields plunged 46 percent and 32 percent, respectively, from the previous year. Minnesota's

Table 7--Net farm income by State, 1992-93

State	1992			1993		
	Gross farm income	Total production expenses	Net farm income	Gross farm income	Total production expenses	Net farm income
\$1,000						
ALABAMA	3,397,987	2,249,558	1,148,429	3,490,980	2,397,926	1,093,054
ALASKA	33,802	26,341	7,461	34,940	27,839	7,101
ARIZONA	1,984,385	1,383,011	601,374	2,099,625	1,461,867	637,758
ARKANSAS	5,587,829	4,094,095	1,493,734	5,457,222	4,405,945	1,051,277
CALIFORNIA	20,281,585	14,937,421	5,344,164	21,533,128	16,298,304	5,234,824
COLORADO	4,225,030	3,459,661	765,369	4,688,842	3,692,737	996,105
CONNECTICUT	557,551	340,770	216,781	565,089	349,027	216,062
DELAWARE	691,484	565,344	126,140	683,733	576,882	106,851
FLORIDA	6,344,670	3,507,431	2,837,239	6,069,908	3,846,195	2,223,713
GEORGIA	4,765,335	3,040,211	1,725,124	4,875,758	3,343,531	1,532,227
HAWAII	542,055	505,280	36,775	519,319	490,428	28,891
IDAHO	3,019,570	2,097,084	922,486	3,314,319	2,242,263	1,072,056
ILLINOIS	9,372,985	7,678,694	1,694,291	9,160,788	7,818,613	1,342,175
INDIANA	5,503,120	4,753,382	749,738	5,770,201	4,938,663	831,538
IOWA	12,007,112	9,795,210	2,211,902	10,220,511	9,758,267	462,244
KANSAS	8,639,838	6,834,211	1,805,627	8,604,895	6,981,998	1,622,897
KENTUCKY	3,871,328	2,514,547	1,356,781	3,777,575	2,642,785	1,134,790
LOUISIANA	2,406,810	1,827,567	579,243	2,245,597	1,910,914	334,683
MAINE	567,184	409,093	158,091	570,634	416,205	154,429
MARYLAND	1,584,706	1,216,638	368,068	1,550,661	1,238,191	312,470
MASSACHUSETTS	572,593	360,305	212,288	559,592	368,485	191,107
MICHIGAN	3,808,732	3,214,274	594,458	4,062,372	3,438,268	624,104
MINNESOTA	8,095,706	6,568,655	1,527,051	7,105,374	6,912,751	192,623
MISSISSIPPI	3,416,548	2,608,543	808,005	3,230,433	2,862,560	367,873
MISSOURI	5,222,862	4,245,287	977,575	4,906,925	4,342,974	563,951
MONTANA	2,100,712	1,628,457	472,255	2,511,026	1,746,351	764,675
NEBRASKA	10,006,237	7,309,871	2,696,366	9,871,749	7,779,525	2,092,224
NEVADA	271,978	211,569	60,409	310,726	230,327	80,399
NEW HAMPSHIRE	210,982	140,079	70,903	200,991	143,414	57,577
NEW JERSEY	781,731	558,302	223,429	813,105	571,143	241,962
NEW MEXICO	1,680,185	1,175,533	504,652	1,834,577	1,269,295	565,282
NEW YORK	3,184,863	2,535,483	649,380	3,050,498	2,556,663	493,835
NORTH CAROLINA	6,175,123	3,677,975	2,497,148	6,471,604	3,982,154	2,489,450
NORTH DAKOTA	3,864,136	2,731,006	1,133,130	3,540,089	2,850,230	689,859
OHIO	4,970,019	3,811,716	1,158,303	5,138,800	3,955,629	1,183,171
OKLAHOMA	4,394,584	3,290,785	1,103,799	4,665,538	3,415,889	1,249,649
OREGON	3,048,273	2,323,190	725,083	3,389,193	2,484,311	904,882
PENNSYLVANIA	4,064,468	3,190,001	874,467	4,038,739	3,222,346	816,393
RHODE ISLAND	82,820	45,073	37,747	87,381	46,982	40,399
SOUTH CAROLINA	1,408,151	1,035,880	372,271	1,418,077	1,130,127	287,950
SOUTH DAKOTA	3,941,557	2,580,501	1,361,056	3,908,477	2,729,816	1,178,661
TENNESSEE	2,766,861	2,028,103	738,758	2,658,995	2,109,601	549,394
TEXAS	14,181,416	10,981,962	3,199,454	15,724,659	11,626,694	4,097,965
UTAH	922,198	616,575	305,623	946,228	655,580	290,648
VERMONT	555,486	393,495	161,991	517,097	402,778	114,319
VIRGINIA	2,495,584	1,836,237	659,347	2,372,967	1,907,874	465,093
WASHINGTON	5,180,982	3,648,585	1,532,397	5,567,487	3,995,285	1,572,202
WEST VIRGINIA	455,451	356,883	98,568	514,305	409,411	104,894
WISCONSIN	6,033,567	5,111,296	922,271	5,778,220	5,304,715	473,505
WYOMING	934,194	687,742	246,452	1,002,342	740,264	262,078
UNITED STATES	200,212,365	150,138,912	50,073,453	201,431,291	158,030,022	43,401,269

farms were also ravaged by flood waters. Other States that are big producers of corn, soybeans, and other field crops but are not in the upper Mississippi river flood plains (e.g., Illinois, Indiana, and Ohio) did not have substantial drops in farm incomes in 1993.

Net farm income rose in 17 States in 1993, with a median increase of 10.9 percent. See table 7. Farm incomes tended to rise in States where livestock production dominates. Montana posted the largest income gain with a 62-percent jump, followed by Nevada, Colorado, and Texas--all cattle producers and beneficiaries of higher cattle prices. Farm income was stable in States where the leading commodities are specialty crops (e.g., California, Florida, and North Carolina). Net farm

income in the remaining 33 States showed a median decrease of 20.8 percent. The States with the largest percentage decreases were those along the Mississippi River, and to a lesser extent those southeastern States experiencing drought. The States with the largest earning declines were Minnesota (87 percent) and Iowa (79 percent). Minnesota and Iowa had average corn yields of 70 and 80 bushels per acre, respectively, in sharp contrast to 114 and 147 bushels in 1992.

Generally, rankings of net farm income per operation and per acre did not change dramatically from 1992 for most States. For example, in 1993 the positive effects of strong commodity prices were nationwide. Still, not all farmers fared the same. Some farmers suffered large declines in farm income in States

New Ways To Get Farm Income Data

ERS now offers an AutoFAX Information System to speed delivery of information on agriculture and the economy. Use the telephone attached to your FAX machine to call 1-202-219-1107. Follow the voice prompts (listen on the handset) to enter the document ID number that designates the desired information. The system sends the documents to your fax machine. Most of the farm income information corresponds to tables published in the National and State Financial Summaries of the *Economic Indicators of the Farm Sector*. One document contains the forecasts for farm income. State documents contain information about income, cash receipts by commodity with rankings, and balance sheet. Information in the AutoFAX system will be the latest available. (If you have questions after you have tried the system, call Cheryl Steele, Ph. 202-219-0793)

Two document numbers that will help you get started and stay current are:

- 411 List of directories for information available on the AutoFAX System
- 4001 Directory of farm income documents (3 - 6 pages/tables per document).

ERS has discontinued publication of the periodical entitled *Ranking of States and Commodities by Cash Receipts*. The tables, however, are available in appropriate AutoFAX documents. For example, the leading commodities for a State are included in that State's document, along with additional tables for cash receipts, farm income, and balance sheet.

Each month, the Farm Income Estimation Section releases the latest monthly cash receipts figures for crops, and livestock and products by State; and cash receipts for major commodity categories for the United States. You may receive this information through regular mail or E-mail. To receive these data by mail, please send us at least 11 self-addressed envelopes with 29 cents postage attached for envelopes that measure no more than 4-1/8 by 9 inches. Larger envelopes will likely require 52 cents. With E-mail, you will receive the data within hours of release. You will receive an ASCII file that can be used in most word processing and spreadsheet packages. If you wish to receive these data by E-mail, send your E-mail address along with your name, address, phone number, and affiliation to BDUBMAN@ERS.BITNET. (Contact: Bob Dubman, Ph. 202-219-0809)

Some of the farm income and balance sheet statistics that can be obtained electronically extend data that appeared in past issues of the *Economic Indicators* publications. Data are available on diskettes, on CD-ROM, and on the worldwide INTERNET system. A catalog of ERS data products is available by calling, toll-free, 1-800-999-6779. Please ask for the "Reports" catalog. Data products are made available on the INTERNET system through a cooperative project with Cornell University, where the Albert R. Mann Library distributes ERS data products through a Gopher server, Telnet, and anonymous FTP. Questions should be directed to Oya Y. Rieger, Numeric Files Librarian at the Mann Library (Ph. 607-255-4301 and E-MAIL oyrl@cornell.edu).

hit by the heavy rains and the drought. Iowa fell from 28th to 49th in income per operation and from 25th to 44th in income per acre. Minnesota fell from 35th to last in income per operation and from 32nd to last in income per acre.

States producing greenhouse/nursery, citrus, and vegetables tend to lead the rankings on both a per operation or per acre basis. These tend to be heavily populated, coastal States, where land values are high and farming must compete with non-agricultural uses of the land. High-valued commodities may provide a competitive return in these States. In contrast, the States producing the most farm income (in the Midwest) and the major livestock producing States tend to be lower ranked on a per operation or per acre basis. Grain and livestock production tend to be associated with low per operation and low per acre net farm income.

The top 10 States, as ranked by aggregate net farm income, experienced some minor shuffling of positions, but only one change in membership from the prior year with 10th-placed

Oklahoma replacing Iowa. Over time, a State's production base is the primary determinant of its rank, but in 1993 there were the aforementioned exceptions due to regional disparities in weather.

There was a single change in the composition of the 10 leading States in net farm income per operation, even though some States had minor shifts in position within the group. This stability exists because size of operations and the commodity mix produced tend to change only gradually.

Likewise, one change occurred in the composition of the 10 leading States in per acre net farm income, as Georgia and New Hampshire switched positions as the 10th and 11th ranked States. The commodity mix produced within States is dictated by land type, productivity, and other determinants of comparative economic advantages that typically change at a very slow pace. The cumulative effects of persistent trends appear in the rankings as evidenced by California's slip in rank over several years. California's agricultural production

Table 8 - Farm marketings for 1992 and 1993, Government payments for 1993, and principal commodities for 1993, by State

State	Farm marketings, 1992			Farm marketings, 1993			1993 Govern- payments			State rank for total farm marketings, four prin- cipal commodities in order of marketing receipts, and percentage of total marketings	
	Total		Crops	Livestock and products		Total	Crops	Livestock and products			
	\$1,000			\$1,000			\$1,000				
AL	2,816,077	768,611	2,047,466	2,910,350	726,480	2,183,870	137,240	24-Broilers, cattle, eggs, greenhouse (74%)	1,789	50-Greenhouse, dairy prod. potatoes, hay. (80%)	
AK	25,795	19,699	6,096	26,572	20,704	5,868	1,788	50-Greenhouse, dairy prod. potatoes, hay. (80%)	1,789	50-Greenhouse, dairy prod. tobacco, soybeans (56%)	
AZ	1,839,427	946,851	892,576	1,921,615	1,036,819	884,796	113,878	31-Cattle, cotton, dairy prod. hay (62%)	704,667	14-Broilers, soybeans, cotton, cattle (69%)	
AR	4,659,615	1,949,596	2,710,019	4,381,693	1,479,897	2,901,796	522,146	1-Dairy prod. greenhouse, grapes, cattle (40%)	522,146	1-Dairy prod. greenhouse, grapes, cattle (40%)	
CA	18,896,146	13,840,547	5,055,599	19,850,377	14,603,974	5,246,403	2,878,618	250,253	16-Cattle, wheat, corn, dairy prod. (76%)	2,892	41-Greenhouse, eggs, dairy prod. aquaculture (72%)
CO	3,800,788	1,055,061	2,745,727	4,082,580	1,203,362	2,63,356	2,878,618	2,892	41-Greenhouse, eggs, dairy prod. aquaculture (72%)	2,892	40-Broilers, soybeans, corn, greenhouse (80%)
CT	506,431	252,851	253,580	521,364	622,070	159,998	4,548,244	1,201,585	110,680	8-Greenhouse, oranges, tomatoes, sugar (51%)	
DE	628,052	177,398	450,654	622,070	5,749,929	4,62,972	2,638,627	2,572,071	225,493	15-Broilers, peanuts, cattle, eggs (60%)	
FL	6,091,697	4,932,102	1,159,595	4,210,698	4,210,412	1,638,627	2,572,071	2,572,071	2,572,071	2,572,071	
GA	4,086,877	1,781,412	2,305,465	2,305,465	1,638,627	1,638,627	2,572,071	2,572,071	2,572,071	2,572,071	
HI	520,222	431,068	89,154	491,450	406,087	85,363	3,131	43-Sugar, pineapples, greenhouse, nuts (69%)	1,167,199	159,316	
ID	2,774,640	1,601,357	1,173,283	2,841,063	1,679,864	2,247,894	851,190	22-Cattle, potatoes, dairy prod. wheat (69%)	851,190	5-Corn, soybeans, hogs, cattle (87%)	
IL	7,647,893	5,394,786	2,253,107	8,082,449	5,834,555	2,186,214	1,931,734	11-Corn, soybeans, hogs, cattle (76%)	378,953	11-Corn, soybeans, hogs, cattle (76%)	
IN	4,462,679	2,638,709	1,823,970	5,117,948	3,186,223	4,172,532	5,828,691	1,229,544	3-Hogs, corn, cattle, soybeans (90%)	1,229,544	3-Hogs, corn, cattle, soybeans (90%)
IA	10,409,111	4,809,503	5,599,608	10,001,223	2,493,157	4,870,164	783,963	6-Cattle, wheat, corn, soybeans (86%)	783,963	6-Cattle, wheat, corn, soybeans (86%)	
KS	7,169,462	2,386,946	4,782,516	7,363,321	2,493,157	4,870,164	783,963	6-Cattle, wheat, corn, soybeans (86%)	783,963	6-Cattle, wheat, corn, soybeans (86%)	
KY	3,203,692	1,562,948	1,640,744	3,376,114	1,656,018	1,720,096	96,697	20-Tobacco, cattle, horses, dairy prod (71%)	96,697	33-Cotton, sugar, cattle, soybeans (55%)	
LA	1,911,038	1,299,336	611,702	1,756,973	1,069,131	687,842	367,357	45-Eggs, potatoes, dairy prod. aquaculture (69%)	19,667	45-Eggs, potatoes, dairy prod. aquaculture (69%)	
ME	457,711	204,377	252,794	472,312	198,081	274,231	559,509	559,509	559,509	559,509	
MD	1,365,234	576,244	788,990	1,365,451	507,044	805,942	26,289	35-Broilers, greenhouse, dairy prod. soybeans (68%)	26,289	35-Broilers, greenhouse, dairy prod. soybeans (68%)	
MA	486,838	360,845	125,993	497,276	375,105	122,171	3,643	42-Greenhouse, cranberries, dairy prod. eggs (71%)	1,375,827	241,342	
MI	3,220,119	1,909,500	1,310,619	3,366,851	1,991,024	1,374,835	21-Dairy prod. corn, greenhouse, soybeans (53%)	2,799,900	823,250	21-Dairy prod. corn, greenhouse, soybeans (53%)	
MN	7,023,220	3,413,029	3,610,178	5,574,335	2,028,351	1,576,916	383,791	7-Dairy prod. cattle, hogs, corn (63%)	383,791	27-Broilers, cotton, soybeans, aquaculture (72%)	
MS	2,634,675	1,279,559	1,355,116	2,605,267	1,028,351	2,269,610	455,364	11-Cattle, soybeans, hogs, corn (64%)	455,364	11-Cattle, soybeans, hogs, corn (64%)	
MO	4,173,650	1,987,299	2,186,351	4,052,901	1,783,291	2,938,347	338,008	32-Cattle, wheat, barley, hay (87%)	338,008	21-Dairy prod. corn, greenhouse, soybeans (53%)	
MT	1,705,745	807,980	897,765	1,781,032	842,685	5,842,066	806,273	4-Cattle, corn, hogs, soybeans (89%)	806,273	4-Cattle, corn, hogs, soybeans (89%)	
NE	8,782,492	3,107,072	5,675,420	8,909,365	3,067,299	186,502	7,013	47-Cattle, hay, dairy prod. potatoes (87%)	7,013	47-Cattle, hay, dairy prod. potatoes (87%)	
NV	276,417	74,701	201,716	288,516	102,014	186,502	140	48-Dairy prod. greenhouse, xmas trees, apples (65%)	140	39-Greenhouse, dairy prod. eggs, blueberries (43%)	
NH	145,245	80,596	64,649	163,376	98,539	64,837	140	49-Greenhouse, eggs, dairy prod. potatoes (70%)	140	36-Tobacco, broilers, cattle, greenhouse (51%)	
NJ	653,534	463,208	190,326	706,384	507,044	198,680	7,298	36-Tobacco, broilers, cattle, greenhouse (51%)	7,298	36-Tobacco, broilers, cattle, greenhouse (51%)	
NM	1,530,308	491,502	1,038,806	1,620,921	486,197	1,134,724	76,442	34-Cattle, dairy prod. hay, greenhouse (78%)	1,134,724	1,134,724	
NY	2,916,826	1,010,158	1,906,668	2,798,483	929,802	1,887,526	72,286	26-Dairy prod. greenhouse, cattle, apples (74%)	72,286	9-Tobacco, broilers, hogs, turkeys (64%)	
NC	5,177,284	2,378,801	2,234,172	5,456,536	2,255,910	3,200,626	132,448	23-Weat, cattle, barley, sugarbeets (75%)	132,448	564,531	
ND	2,983,553	2,234,172	749,381	2,933,426	2,226,971	706,555	564,531	23-Weat, cattle, barley, sugarbeets (75%)	564,531	23-Weat, cattle, barley, sugarbeets (75%)	
OH	4,108,223	2,558,452	1,549,771	4,393,311	2,719,991	1,673,320	265,374	13-Soybeans, corn, dairy prod. greenhouse (63%)	265,374	13-Soybeans, corn, dairy prod. greenhouse (63%)	
OK	3,665,101	1,112,451	2,552,650	3,869,377	1,107,795	2,761,582	323,949	18-Cattle, wheat, greenhouse, broilers (80%)	323,949	18-Cattle, wheat, greenhouse, broilers (80%)	
PA	3,598,877	1,044,473	2,554,404	3,712,294	1,090,672	2,621,622	92,806	28-Cattle, greenhouse, dairy prod. wheat (46%)	92,806	19-Dairy prod. cattle, greenhouse, mushrooms (68%)	
RI	72,807	60,229	12,528	79,137	66,842	12,295	45,151	19-Dairy prod. cattle, greenhouse, mushrooms (68%)	45,151	49-Greenhouse, eggs, dairy prod. potatoes (70%)	
SC	1,197,052	651,798	545,254	1,221,314	618,189	603,125	102,512	36-Tobacco, broilers, cattle, greenhouse (51%)	102,512	36-Tobacco, broilers, cattle, greenhouse (51%)	
SD	3,157,375	1,197,768	1,959,607	3,319,712	1,146,924	2,172,788	432,424	22-Cattle, wheat, hogs, corn (76%)	432,424	22-Cattle, wheat, hogs, corn (76%)	
TN	2,121,450	1,063,165	1,058,285	2,038,553	1,026,942	1,011,611	160,624	30-Cattle, dairy prod. tobacco, soybeans (56%)	160,624	30-Cattle, dairy prod. tobacco, soybeans (56%)	
TX	11,461,101	3,936,886	7,524,215	12,616,905	4,274,683	8,342,222	1,420,830	2-Cattle, cotton, dairy prod. greenhouse (73%)	1,420,830	2-Cattle, cotton, dairy prod. greenhouse (73%)	
UT	752,808	194,927	557,881	803,532	177,228	626,304	1,420,830	36,614	36,614	36,614	
VT	460,366	72,369	387,997	483,476	80,904	402,572	3,377	38-Cattle, dairy prod. cattle, greenhouse, xmas trees (89%)	3,377	44-Dairy prod. cattle, greenhouse, xmas trees (89%)	
VA	2,140,800	778,702	1,362,098	2,067,695	682,794	1,384,901	46,346	29-Broilers, cattle, dairy prod. tobacco (56%)	46,346	29-Broilers, cattle, dairy prod. tobacco (56%)	
WA	4,436,516	2,888,787	1,547,729	4,573,598	3,012,846	1,560,752	207,208	12-Cattle, apples, dairy prod. wheat (56%)	207,208	12-Cattle, apples, dairy prod. wheat (56%)	
WV	343,243	76,122	267,121	404,677	76,999	327,678	6,259	46-Cattle, broilers, dairy prod. turkeys (73%)	6,259	46-Cattle, broilers, dairy prod. turkeys (73%)	
WI	5,469,133	1,157,505	4,311,628	5,250,417	1,086,248	4,164,169	310,168	10-Dairy prod. cattle, corn, hogs (80%)	310,168	10-Dairy prod. cattle, corn, hogs (80%)	
WY	776,024	169,473	606,551	817,311	160,336	656,975	43,213	37-Cattle, sugar beets, hay, sheep (88%)	43,213	37-Cattle, sugar beets, hay, sheep (88%)	
U.S.	171,202,430	84,852,758	86,349,672	175,052,103	84,497,350	90,554,753	13,402,015	Cattle, dairy prod., corn, soybeans (49%)	13,402,015	Cattle, dairy prod., corn, soybeans (49%)	

has undergone some change due to the rising costs of production inputs, including irrigation water.

Regionally, States ranked highest in net farm income per operation tend to be located in the Southeast, Northeast, and Pacific Coast. The leading States in regards to net farm income per acre were all coastal States. This reflects production of specialty crops (e.g., greenhouse and nursery) and poultry in these regions. Appalachian, Delta, Lake, and Corn Belt States tended to have moderate net farm income per operation and per acre. The Northern Plains, Southern Plains, and Mountain States had high income per operation and low income per acre, indicative of large operations with low-value products on a per acre basis.

Production Expenses Rise

Total production expenses in 1993 jumped nearly \$8 billion from 1992, rising nearly 6 percent. A rise of \$6.7 billion in intermediate product expenses accounted for the bulk of the increase and a \$1-billion rise in labor costs accounted for most of the rest. Farmers' purchases of feed, seed, livestock, and water for irrigation each rose more than \$1 billion.

All but two States had increased production expenses. There was a discernible regional and commodity-related pattern. The largest increases tended to occur in western and cattle producing States. Iowa was the only one of the 48 contiguous States to record a decline in production expenses, reflecting the devastation that occurred early in the crop production cycle. Hawaii farmers also incurred fewer expenses due to a continuous contraction in crop production unrelated to the floods.

The composition and rank of the top 10 States in farm expenses remained unchanged from the prior year, except that Missouri and Arkansas switched positions in the 10th and 11th slots. These top 10 States accounted for 51.8 percent of total expenses, nearly unchanged from the previous year. Per

operation and per acre rankings remained essentially unchanged. Increases in a State's per farm expenses are partly due to decreases in the number of farms in a State rather than changes in a State's commodity mix. Commodity mixes tend to change slowly, if at all.

Florida, North Carolina, and Georgia were among the top 10 States in net farm income, but outside the top 10 in farm expenses, which reflects the high-valued commodities they produce--broilers, greenhouse/nursery, tobacco, and fruit. Conversely, Wisconsin and Indiana were among the top 10 in expenses, but were outside the top 10 in net farm income, which reflects their major commodities, milk and grains.

Production expenses display the same regional patterns of per acre rankings associated with net farm income. In the group of top 10 States, 9 are the same in both rankings. This is consistent with economic theory that at the margin, the rate of return for a factor of production must be the same. A lower rate of return means the factor of production will find alternative employment in the production of another commodity.

In per operation rankings, there is less consistency in the composition of the top 10 States for net farm income and production expenses, than there is in the rankings computed on both the aggregate and per acre basis. Six States made both lists. In expenses per operation, Colorado, Hawaii, Kansas, and Illinois were among the top 10 States, but were outside the top 10 in net farm income per operation. In net farm income per operation, Florida, Rhode Island, Connecticut, and North Carolina were among the top 10, but outside the top 10 in expenses per operation. The achievement of a high ranking under per operation tends to reflect two attributes: the size of operations, which are often large in the cattle States, and high value of production per acre, common to the production of fruit and commodities produced in structures, particularly poultry and greenhouse/nursery products.

The Influence of Farm Organizational and Operator Characteristics on Corn Costs of Production

by William D. McBride ¹

Abstract: Among farm organizational characteristics, specialization in corn production, land tenure, irrigation, crop rotation, and corn expense structure are significant determinants of the cost of producing a bushel of corn. Operator occupation and age are significant operator characteristics. Corn expense structure, operator occupation, and land tenure have the greatest individual effects on per unit production costs. Production costs per bushel of corn increase as the corn expense structure includes a greater proportion of fixed costs. Farm operators whose major employment is farming have lower per bushel production costs than others. Land ownership results in lower per bushel production costs for corn than land rental through either cash or share leases.

Keywords: Corn, production costs, cost variation, Farm Costs and Returns Survey

Production cost estimates are most often presented as an average annual cost for a particular area or group of producers. USDA prepares annual average costs of production estimates for U.S. and major production regions of field crops and livestock (4). Most universities project annual production costs in farm planning budgets.

This study examines production cost variation among U.S. corn growers by determining which, if any, of several common farm organizational and operator characteristics are statistically associated with costs of production. Farm organizational and operator characteristics are also ranked according to the extent to which they contribute to production cost variation. Information about the influence of these variables on costs of production may provide insight about which farm operators and management practices are associated with lower per bushel production costs.

Sources of Production Cost Variation

Variation in production costs arises from several interrelated sources. For the purposes of this report, sources of production cost variation can be divided into four categories: 1) random effects that vary by year and locality; 2) quality of the resource base; 3) input prices, and; 4) farm managerial characteristics.

The production of agricultural commodities, particularly field crops, is subject to a significant amount of variation in factors that are beyond control of the manager. The most influential of these random factors is weather. Annual and local effects of weather on yields, and thus on per bushel production costs, can be substantial and result in a major source of production cost variation among field crop producers. Yield variation is also influenced by differences in farm resources. For field crops, land quality differences provide a major source of unit production cost variation. Input price variation affects the level of input use and input mix.

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Table A-1--U.S. Farm operator production costs per planted acre for corn, 1991

Item	1991
Yield (expected bushels/acre)	130.72
Farm operator share	113.22
Dollars	
Cash costs:	
Variable cash costs--	
Seed	19.40
Fertilizer	38.65
Chemicals	19.77
Custom operations	6.76
Fuel, lube, and electricity	19.47
Repairs	15.44
Hired labor	6.96
Purchased irrigation water	0.30
Commercial drying	1.41
Fixed cash costs--	
Real estate & property taxes	5.50
Insurance	4.20
Interest	16.23
Land rental	21.57
Other farm overhead	9.83
Noncash costs:	
Depreciation	16.63
Hired labor benefits	0.41
Summary of costs:	
Variable cash costs	128.17
Fixed cash costs	57.33
Noncash costs	17.04
Total	202.54
Cost per expected bushel	1.79

Source: USDA Farm Costs and Returns Survey, 1991

Farm managerial characteristics reflect the influence of management decisions made by the farm operator. Included are organizational characteristics such as size of farm, production specialization, land tenure, production practices, and financial status. Management decisions that determine these characteristics obviously influence commodity production costs, but the extent is not as apparent as for the other sources of cost variation. Even less obvious is the influence of operator characteristics on production costs. Presumably, such factors as operator occupation, age, and educational attainment influence managerial competence.

Table A-2--Mean and variation of the sample variables

Variable	Mean	Coefficient of variation 1/
Cost per expected bushel of corn production	1.79	2.67
Organizational characteristics		
Size (corn acres planted)	164.51	6.75
Specialization (percent of operated acres in corn)	32.11	2.96
Land tenure (percent of corn acres share rented)	21.10	9.78
Land tenure (percent of corn acres cash rented)	24.17	7.62
Irrigation (percent of corn acres irrigated)	8.13	19.85
Rotation (percent of farms using corn in crop rotation)	0.62	4.10
Capitalization (horsepower of largest tractor used on corn)	135.96	2.41
Farm debt-to-asset ratio	0.17	6.31
Expense structure (corn fixed-to-total cash cost ratio)	0.24	3.70
Operator characteristics		
Major occupation (1=farming; 0=otherwise)	0.88	1.65
Age (years)	50.39	1.41
Education (1-less than high school; 0=otherwise)	0.19	11.04
Education (1-high school graduate; 0=otherwise)	0.66	3.96
Education (1-college graduate; 0=otherwise)	0.15	12.19

1/ The coefficient of variation is a measure of the sample variation expressed as a percent of the mean.
 Source: USDA Farm Costs and Returns Survey, 1991

Data and Methods

Data from a special corn version of USDA's 1991 Farm Costs and Returns Survey are used to examine the influence of farm organizational and operator characteristics on costs of corn production.² Production costs are estimated for farm operators (table A-1), rather than for the sector as published annually by the USDA (4). Farm operator estimates differ from sector estimates by excluding landlord shares of costs and returns and excluding economic costs of owned inputs (3). The distinction between operator and landlord costs is important in this study because the relationship of farm organization and operator with costs of production is examined. Likewise, economic costs (or opportunity costs) of owned inputs are excluded so that the implications of farm resource tenure and financial condition can be explored.

Farm operator estimates include cash and noncash production costs. Cash costs are divided into variable and fixed components. Variable input costs for corn are reported directly by farm operators in the Farm Costs and Returns Survey, excluding any landlord contributions. Fixed cash costs, including property taxes, insurance, interest, and other overhead costs, are estimated by allocating whole-farm expenditures reported by each operator according to the value of corn production as a proportion of the total value of farm production. Land rental cost is the actual expenditure for cash-rented corn acreage. Real estate taxes are charged only on owned acreage planted to corn.

Also included are noncash costs for depreciation and hired labor benefits. The whole-farm depreciation expense is allocated to corn according to the value of corn production, while the value of noncash benefits provided for hired labor (housing, meals, etc.) is allocated to corn by each farm operator.

To control for variations in yield resulting from factors beyond the farm operator's control (primarily weather) per unit corn

² Special commodity versions of the Farm Costs and Returns Survey are conducted on a rotating basis every 4-5 years. U.S. corn producers were surveyed in 1987 and 1991.

production costs are expressed using the expected yield farm operators reported prior to planting. The expected yield reported by producers in the Farm Costs and Returns Survey is that yield on which production and input use decisions were made (table A-1).

Expressing cost per unit of expected yield reduces the effects of weather, pests, and other uncontrollable events that occur during the growing season on unit production costs³. Expected yield also indicates the planned yield of each farmer given the unique resource capabilities of individual farm operations and the selected input mix.

Because costs include only that portion paid by farm operators, expected yield on share-rented acreage includes only the portion expected by the farm operator. Farm operator costs per acre are divided by the expected yield to express per bushel costs that were expected, or planned for, on each farm operation.

The statistical association between the per unit costs of production and several farm organizational and operator characteristics is tested using regression analysis. To measure the extent to which each characteristic influences production costs, the sample variation of production cost per unit is decomposed into the portion attributable to each characteristic.

Farm Organizational and Operator Characteristics

Farm organizational characteristics are chosen as possible factors affecting per unit production costs among U.S. corn growers (table A-2). Size of the corn enterprise, as measured by planted acreage, is expected to be inversely related to costs of production. Larger farms typically have lower unit costs

³ Expressing cost per unit of expected yield does not entirely account for the effects of uncontrollable events on unit production costs. For example, harvesting and hauling costs are reported for the harvested yield but would likely differ had expected yield been realized.

Table A-3--Regression estimates of the unit cost equation

Variable	Coefficient 1/	t-statistic
Intercept	1.3754142	4.597 **
Organizational characteristics		
Size (corn acres planted)	-0.0000358	-0.872
Specialization (percent of operated acres in corn)	-0.0060250	-2.237 **
Land tenure (percent of corn acres share rented)	0.0033945	3.323 **
Land tenure (percent of corn acres cash rented)	0.0034404	2.411 **
Irrigation (percent of corn acres irrigated)	0.0027843	2.755 **
Rotation (percent of farms using corn in crop rotation)	-0.1769053	-2.172 **
Capitalization (horsepower of largest tractor used on corn)	0.0018531	1.334
Farm debt-to-asset ratio	0.0890476	0.471
Expense structure (corn fixed-to-total cash cost ratio)	1.0247638	2.929 **
Operator characteristics		
Major occupation (1=farming; 0=otherwise)	-0.4665222	-3.154 **
Age (years)	0.0080093	2.356 **
Education (1-less than high school; 0=otherwise)	0.1105322	0.725
Education (1-high school graduate; 0=otherwise)	0.0824309	0.672
F = 6.960 **	R2 = 0.126	

1/ Because the FCRS uses a complex sample design, coefficients were estimated using weighted regression with PC CARP (1). PC CARP produces coefficients with unbiased standard errors because it considers the complex sample design, unlike most other conventional regression programs.

** indicates statistical significance at the 95% level of confidence

because costs of fixed inputs, such as machinery and equipment, can be spread over more units of output.

Specialization in corn production, as measured by the percent of operated acreage planted to corn, is also expected to be inversely related to production costs. Operators of more specialized farms are expected to develop greater managerial skills and be more aware of cost-saving techniques.

The effect of land tenure variables (percent of acreage cash-and share-rented) could be positive or negative depending on the relative costs of land ownership and rental. Producers with a higher portion of their acreage irrigated are expected to have higher unit production costs, while producers who rotate corn with other crops are expected to have lower production costs per unit.

The effects of farm financial condition are also examined. Three measures of farm financial structure and status are: 1) degree of capitalization, represented by the horsepower of the largest tractor used for corn; 2) farm debt-to-asset ratio, and; 3) corn expense structure, measured as the ratio of fixed to total cash costs. All three financial measures are expected to be positively related to per unit production costs.

Farm operator characteristics include major occupation, age, and education (table A-2). Major occupation is defined as that job, farming or otherwise, on which the operator spent the majority of time during 1991. Farm operators whose major occupation is farming are expected to have lower production costs than others. The influence of age on unit production costs is difficult to discern. Younger producers may be more aware of and more willing to try new, cost-saving production techniques. However, younger farmers more often require debt financing, resulting in higher unit costs. Education is expected to be negatively related to unit production costs. Education was measured using binary variables for each of three groups: 1) operators not graduating from high school; 2) operators completing high school, but not college; and, 3) operators completing college.

Results

The relationship between per unit costs of production and farm organizational and operator variables is estimated for a sample of U.S. corn growers. Coefficient estimates and t-statistics are presented in table A-3. The estimated coefficients describe the change in corn production cost per bushel from a unit change in each of the organizational and operator variables. The t-statistics indicate which of the estimated coefficients are significantly different from zero. Among farm organizational characteristics, specialization in corn production, land tenure, irrigation, crop rotation, and expense structure are significant determinants of corn production costs per unit.

As expected, specialization and rotation are negatively related to unit cost. The coefficient on the rotation variable implies that producers who rotate crops with corn have per bushel costs that average about 18 cents per bushel lower than other producers. Land tenure, irrigation, and corn expense structure were all positively associated with unit cost. Planting corn on either cash- or share-rented land results in higher unit costs than using owned land. Average per bushel costs on irrigated acres are about 28 cents higher than on nonirrigated acres. Also, increasing the ratio of fixed to total cash costs results in higher unit costs.

Among farm operator characteristics, major occupation and age are significant determinants of corn unit production cost. Producers whose major occupation is farming have production costs that average about 47 cents per bushel lower than producers whose major occupation is not farming. Age is positively related to unit production cost, with older farm operators having higher costs than younger operators. Education, as measured in this study, does not significantly affect unit production costs.

Table A-4 includes the decomposition of unit cost variation into the variance effects of each explanatory variable. Variance effects indicate the amount of variation in unit costs that

Table A-4--Contribution of factors to unit cost variation

Variable	Variance effect 1/	Percent of variance effect
Organizational characteristics		
Size (acres planted to corn)	0.00005	0.04
Specialization (percent of operated acres in corn)	0.01260	10.15
Land tenure (percent of corn acres share rented)	0.01430	11.49
Land tenure (percent of corn acres cash rented)	0.01440	11.60
Irrigation (percent of corn acres irrigated)	0.00554	4.46
Rotation (percent of farms using corn in crop rotation)	0.00741	5.97
Capitalization (horsepower of largest tractor used on corn)	0.00512	4.12
Farm debt-to-asset ratio	0.00032	0.26
Expense structure (corn fixed-to-total cash cost ratio)	0.02630	21.22
Operator characteristics		
Major occupation (1=farming; 0=otherwise)	0.02260	18.23
Age (years)	0.01200	9.70
Education (1-less than high school; 0=otherwise)	0.00190	1.53
Education (1-high school graduate; 0=otherwise)	0.00152	1.22
Total	0.12416	100.00

1/ The sample variation of unit production cost was decomposed into variance and covariance effects (2). Variance effects indicate the amount of sample variation that can be attributed solely to each variable. Covariance effects indicate the amount of sample variation due to the influence of two or more variables together and individual effects cannot be separated.

can be attributed solely to each explanatory variable. The percent of total variance effects for each explanatory variable indicates the extent that each variable contributed to unit cost variation, relative to other variables.

Among all variables, corn expense structure had the greatest influence on unit cost variation, accounting for 21 percent of total variance effects. Major occupation ranked second, accounting for about 18 percent of the variance effects. Each of the variables for land tenure and crop specialization accounted for more than 10 percent of the total variance effects. Size and farm debt-to-asset ratio had the least influence on per unit production cost, each accounting for less than 1 percent of the variance effects.

Conclusions

This paper examines the influence of several farm organizational and operator factors on per unit production costs of U.S. corn growers. While costs are mostly influenced by weather, land resource capabilities, and input price variations, a statistical association is found between unit costs and specified farm organizational and operator characteristics. Among the variables examined, corn expense structure, as measured by the ratio of fixed to total cash costs, is most influential. Reducing fixed overhead costs, such as taxes, insurance, interest, and land rental payments, appears to be an important strategy for lowering production costs per unit. However,

costs of fixed items such as taxes are beyond the operator's control and are more affected by the actions of policymakers. Full-time farm operators have lower unit costs than part-time operators. The extra time and effort devoted to farm production and managerial activities appears to result in lower unit costs for corn production. Land tenure is also an important factor in controlling unit costs, with land ownership resulting in lower unit costs than land rental through either cash or share leases.

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Poland's Farm and Agriprocessing Banks Face Restructuring

by Agnieszka Alinska, Jacek Kulawik, and Gregory Gajewski 1/

Abstract: The problems of the banks serving Poland's farm and food sectors have reached a crisis serious enough to threaten the stability of the Polish banking system. The government is restructuring the system and trying to improve the standing of the farm-sector banks. The goals of the restructuring are to increase the security of bank activities, ease the problems caused by the large volume of bad debts held by the farm and agriprocessing sectors, and increase the effectiveness of delivering credit to the farm and agriprocessing sectors. If the restructuring is superficial, however, the crisis may go on for decades.

Keywords: Poland, agricultural finance, emerging market economies

Polish agriculture under central planning was organized quite differently than in other Eastern European countries. About 75 percent of farms were privately owned and operated. Private farms were small compared with the collectivized, state-owned farms. The two groups of farms were responsible for meeting planned output goals, but the private farms had more flexibility in their mix of inputs and outputs.

The credit system was more centralized, but a network of over 1,600 agricultural credit cooperatives primarily served the private farms while the national Bank for Food Economy (BGZ) primarily served the state-owned farms and agriprocessing firms. At the time, the cooperatives were part of the BGZ, which had the power to directly control the credit coops, often allocating excess funds from one coop to a distant agriprocessing borrower. However, many of the coops have a long history of operating as private institutions, with some able to trace their roots back 100 years. Under central planning, the agricultural banks simply funneled resources to farms and agriprocessors so they could buy the inputs needed to meet the plan's output targets.

Poland's transition to a market economy began in late 1989. Compared with other former communist nations, the transition began quickly. The process has been difficult, and recent elections shifted the balance of power so that the pace of reform has slowed. Over the long term, the growth and development of a market-oriented economy, including the food and agriprocessing sectors, will benefit not only Poland's

producers and consumers, but also U.S. and world trade and development.

In Poland's agriprocessing sector, firms in strong financial condition and with positive growth prospects were privatized. Agriprocessing firms in weak financial positions remain state-owned and continue to get credit through BGZ. The large share of financially weak firms that rely on the BGZ for credit is one of the problems facing the bank. State farms have in general not been privatized, although some leasing has been permitted. Owners of private farms usually do not have an option to buy or sell farmland because there is no long term agricultural mortgage market. Credit is used to meet the current season's production needs and some equipment needs.

The agricultural credit delivery structure partly disintegrated near the end of 1990. The 1,660 cooperative banks gained full legal independence, which included the rights to reorganize, affiliate with different banks, and to a large extent, to operate independently. Also in 1990, about 390 cooperative banks in better financial standing affiliated with and helped found three completely new private regional banks to serve agriculture as joint stock companies. These regional banks serve their cooperative bank members in several ways, including the provision of advice, guidance, training, financial services, and some supervision. Eventually, the remaining 1,270 coop banks affiliated with the BGZ.

The government, through the Minister of Finance, owns 56 percent of BGZ, and the cooperative banks own the remaining 44 percent. This is a holdover from the communist era, when all the cooperative banks were a part of BGZ.

In 1992, several completely new private joint-stock company banks were established to serve narrow parts of the farm and agriprocessing sectors, such as export promotion and sugar processing. As a result, some limited competition developed. Only two private-sector agricultural banks were established last year.

There was a period when the coop banks had no supervision. Starting on February 7, 1990, BGZ ceased supervision of the

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Editor's note: This article represents part of a collaborative effort between ERS and the IERiGZ through USDA's Institutions Building Program. The article gives an inside look at the Polish policy-making process as officials in the executive and legislative branches of government struggle to transform Poland's economy toward a market-oriented system. If you have questions regarding this article, contact Robert McElroy, (202) 219-0802.

Table B-1--Selected indicators of BGZ activity in 1990-93 1/

Items	1993	1992	1991	1990
Billion PZL				
Irregular receivables 2/	21,363	12,658	5,511	1,914
Pretax profits	n.a.	699	3,016	3,310
After-tax profits	n.a.	334	414	1,896
Irregular receivables as percent of:			Percent	
Assets	30.7	23.5	12.7	6.1
Credits	45.1	35.2	17.8	8.4
Deposits	76.1	60.5	29.8	19.3

n.a. = not available (assumed to be negative).

1/ Source: Gazeta Bankowa, various issues. 2/ Irregular receivables are defined as credits, guarantees, and other receivables that the bank is having difficulty collecting. Included are loans classified as substandard, doubtful, and loss.

coop banks. In 1992, branches of the National Bank of Poland (NBP, which is the nation's central bank, similar to the Federal Reserve System in the United States) assumed regulatory powers over the coop banks. The NBP obligated coop banks without adequate capital to affiliate with BGZ or other regional banks. The lack of proper supervision over the cooperative banks likely is one of the major reasons that many face serious financial difficulties. The first symptoms of financial crisis (irregular receivables, including "bad debts," liquidity problems, and an inadequate pace of capital accumulation, see table B-1) began to appear in 1991 in BGZ, its affiliated coop banks, and other coop banks..

The financial difficulties of agricultural credit institutions were aggravated by the deep recession in the food and agriculture sectors and in the whole economy. The economy had difficulties adjusting to the new free-market system. Banks had problems addressing the burdens of the past, when they had little autonomy. Moreover, bank managers, new to a market-oriented economy, made mistakes. Polish commercial law was inadequate for the new market-oriented system.

First Proposals Surface

As the situation worsened, the first proposals to restructure BGZ and the coop banks were presented. Opinions differed on how the restructuring ought to proceed. One proposal, prepared by the BGZ, some of its affiliated coop banks, and the Ministry of Finance, envisaged simultaneous restructuring of the BGZ and the coop banks. The other proposal was prepared by the three regional banks and their affiliated coop banks, represented in the Home Union of Coop Banks (KZBS), and was supported by the Western coop structures. This alternative proposal suggested a two-tier system (regional banks and cooperative banks) where the cooperative banks would have more independence. The owners of BGZ, namely the State Treasury (represented by the Minister of Finance) and the coop banks could not reach a decision as to the specific rules of restructuring.

This impasse continued until the autumn of 1993. Only then, after the government changed, was work accelerated on restructuring the BGZ and the coop banks. But the crisis in this sector of the Polish banking system had deepened. This was especially the case with BGZ.

Aside from the data in table B-1, little quantitative evidence is available on BGZ's condition. BGZ has answered most government and private surveys and questionnaires by putting "n.a." in for key variables. This is an indirect indicator that BGZ is in bad financial condition.

In 1993, the financial situation of coop banks worsened (table B-2). As of June 1993, the NBP estimated that the 284 most endangered cooperative banks carried deposits guaranteed by the State Treasury worth 6.5 trillion zlotys (about \$325 million).² The coop banks have deposits totaling about 20 trillion zlotys (about \$1 billion) that are guaranteed by the Treasury. Since 1990, new banks' deposits are not explicitly guaranteed. Since then, five coop banks have come into existence.

Dangers created by the BGZ and cooperative banks affecting the security of the Polish banking system accelerated the development of a bill regarding the restructuring of the banks. Two restructuring proposals were developed:

- Government proposal (developed by BGZ, Ministry of Finance, Polish Bank Association, and partially by NBP); and
- Parliament proposal (developed by regional and cooperative banks joining Polish Cooperative Bank Association and crafted in the Parliament).

Government Proposal Called for More Centralization

Under the Government proposal, restructuring of BGZ and cooperative banks would be done simultaneously. The result would be a three-level structure consisting of cooperative banks, nine regional banks, and a national agri-bank (BGZ). Joining regional banks would be obligatory, except for banks that could meet the minimum capital requirements (the equivalent of 5 million ECU in zlotys; one ECU equals about 25,000 zlotys). Also, capital would be required to equal 8 percent of assets. Currently, not a single coop bank meets these requirements.

² In January 1994, one U.S. dollar equaled about 20,000 Polish zlotys.

Table B-2--Number of cooperative banks in Poland facing financial problems, 1993

Number of banks	May	December
	Number	
Bankrupted	12	29
Qualifying for bankruptcy	87	229
Implementing restructuring programs	699	657

This proposal would improve coop banks' security by creating special funds for maintaining their liquidity. Adequate supervision would be provided by the regional banks and the national bank. Other mechanisms would allow transfer of excess funds to regional banks and the national bank. In general, this group of banks would be created as a cooperative shareholder company (one shareholder = one vote). The scope of coop bank operations would increase as all cooperative banks affiliated with the regional banks. That's because the coop banks could draw on the pooled assets of the regional and national net. The regional area of banks' activities would be restricted; probably a cooperative bank could operate in one gmina³. The Government proposal would also lead to more complete integration of cooperative banks with the entire banking system and the financial market, and achieve equal geographic distribution of regional banks.

In contrast, there are some disadvantages associated with this proposal:

- Decisions would be made using the top-down approach, and there would be no balance between the duties and responsibilities of the different levels of this structure. The lack of this balance would be most visible on a coop bank level--coop officers would have little leeway to make independent decisions. Such centralization could turn out to be inflexible and not foster competition.
- The cost of restructuring was not carefully estimated, and was most likely understated. Based on more recent estimates from the Ministry of Finance, the implementation cost of the proposal could range from 14.5 to 28.4 trillion zlotys (\$700-\$1,400 million). These costs may increase because the restructuring does not address some of the fundamental problems of the agricultural credit delivery system.
- The proposal had unresolved legal problems related to the eventual association of a cooperative bank with a commercial bank. In addition, this proposal did not discuss issues related to bankruptcy and liquidation procedures. Now, cooperative banks are subject to the cooperative law and the banking law, which are different on many key points. A solution would be to merge coop banks with commercial banks, and make them subject to commercial bank law only. However, many legal questions arise when such mergers are considered.

The Government proposal has been criticized for pushing cooperative banks into a centralized structure that is contrary

to the constitution. Critics have pointed out that the transfer of free financial resources to other banks violates the regulations protecting private property. In addition, this proposal weakens possibilities for development of particular regions because the central control mechanism would not necessarily allocate funds in an optimal way.

Optimal use of funds would be to assist local community development, in line with expected future profits. Allowing local coops the autonomy to make local lending decisions would lessen the chances for making bad loans. When there are no profitable investments to be made in the region, excess funds should go to other regions. Finally, the Government proposal does not take into consideration the three private regional banks that already exist.

Parliament Proposal Allows More Local Control

Under the Parliament proposal, the new structure of the cooperative banks would also have three levels. The authors of this proposal wanted to separate the process of restructuring BG from the restructuring of the cooperative banks. The cooperative banks would have more freedom and independence to make loans and set interest rates. However, a centralized system of regulatory controls would ensure the safety and soundness of all the banks in the structure.

After 5 years, there would be no geographic boundaries for the regional banks. Partly as a result, transfers of excess funds to the other banks would be made according to sound financial principles--money would flow to where the highest expected future profits are. The Parliament proposal is more market-oriented than the Government proposal. Advantages of this proposal include:

- Cooperative banks would have more freedom about affiliating with the regional banks.
- Regional banks would be evaluated on market-oriented performance.
- The regional banks would have more freedom to function as financial centers, including exercising regulatory control, and providing advisory and information services to member coops.
- Competition would be fostered even within the groups of regional banks, since there would be no limits for the regional area of a bank's activity.

The Parliament proposal also has some disadvantages.

- Optional association, subject to NBP approval, of the cooperative banks into the regional banks may lead to creation of longer communication channels (in Poland the telecommunications system is not satisfactory) and the money transfers among different regions may not be optimal. As a result, the less developed regions of Poland may, in fact, remain unchanged.

³ A gmina is about the size of an average U.S. county.

- The structure lacks, to some extent, its cooperative character, because voting in the national agribank will follow the number of stocks, rather than the rule: one regional bank = one vote.
- The regional banks and cooperative banks would participate in the losses of the group in proportion to their profits. Under this system, incentives for better and more effective operations are much weaker.

Current Polish parliamentary procedures preclude adoption of the Parliament proposal. However, it provides a framework for a compromise that incorporates elements of both proposals.

The Parliament proposal has some other disadvantages that could threaten the stability of Poland's banking system. The proposal allows the cooperative banks to withdraw their shares from BG, creating the potential danger of making BGZ illiquid, as well as insolvent. If the cooperative banks decided to withdraw their deposits from BG, the government would have to find another 10 trillion zlotys from the budget to prevent the Bank from going bankrupt. Because, BG is Poland's third largest bank in terms of owned capital and assets, its bankruptcy could lead to the collapse of the Polish banking system by setting off bank runs on other banks as the public's confidence in the system evaporates.

Alternative Options

The above proposals for BG and cooperative banks' restructuring indicate the complexity of the problem. Parliament has crafted an alternative that comprises many of the better parts of the two proposals already presented.

- The shareholders of the cooperative banks would not have to participate in the bank's loss to the amount equal to the doubled value of their shares (this matter will be regulated by the bank's statutes).
- The State Treasury shares in the national agribank (BGZ) would be sold within 5 years. The regional banks would have a right to merge, change their headquarters, and change their area of operations. This would enable them to better adjust to local conditions and would stimulate the competitiveness among the regional banks.
- The cooperative banks can conduct checking operations, make loans, and set interest rates.
- The three existing independent private regional banks would not have to affiliate with the national agribank (BGZ). However, the question of more freedom and independence for the cooperative banks has not been adequately answered.

During the work on the restructuring proposals, other concepts were examined. One proposed selling shares of the State Treasury in BG to foreign investors. However, it would be difficult to find foreign investors for such a high-risk, low-profit enterprise. Now, there is talk only about getting some foreign money to help to finance the restructuring.

In the past, there were discussions about turning the coop banks into simple cash windows, with lower capital requirements. Then, the coops would disburse and accept deposits, pass loan applications up to a regional bank, issue approved loans, but they could not set interest rates. NBP did not define those requirements or other regulations for this approach. Not surprisingly, the local bankers strongly oppose such an approach because they would lose their autonomy.

Recent Developments and Outlook

A modified version of the Government proposal was passed by the Parliament and signed by the Polish president into law this summer. The three independent regional banks will not be required to affiliate with the central agribank that is to be established. However, the three regional banks will need to raise sufficient capital to meet the NBP's standards. A small number, say three to five coop banks, focusing mainly on handicrafts, may remain independent because they will be able to meet the capital standards.

So, two cooperative bank structures will come into existence. The first will have three levels in line with the Government proposal, and the second will have two levels--the affiliating coop banks with the already existing three independent private regional banks. In the future, however, integration of the two systems cannot be ruled out.

The BGZ can now obtain financial support from the state budget and the NBP. It is expected that those funds will come from restructuring bonds, low-interest notes, preferential credits, state guarantees for bonds issued by the regional banks, tax incentives, and suspension of the rules for provisioning against problem loans. The State Treasury and NBP will institute regulatory controls and supervision over the BGZ, the regional banks, and the coop banks so that the financial assistance is most effectively used. In general, these measures should increase the security of this portion of the Polish banking sector, but more work remains.

Work must be accelerated on establishing formal deposit insurance, credit insurance, and modification of the appropriate laws. Moreover, more work is needed to improve the banks' ability to effectively screen applicants for loans.

Budget support for BGZ and the coop banks will intensify the restructuring of their credit portfolios. The restructuring will focus on the weakest debts--those owed by state-owned enterprises in farming and agriprocessing sectors. There are three tools to accomplish this: arbitration and rescheduling, debt-for-equity swaps, and selling debts at a discount on the secondary market. Experience shows that debt restructuring is a very difficult and painful process. Because of the weaknesses of the vast number of enterprises (about half of state-owned enterprises are not suitable for restructuring, according to the rules for arbitration), fast and radical improvements cannot be expected. Without effective purging of businesses that are not viable, bad debts will continue to grow in agriculture and agribusiness.

The most difficult task will be to make the banking sector more effective in providing sound credit to the food economy.

The macroeconomic assumptions of the government envisage applying a policy of positive real interest rates to stimulate an increase in savings. However, the disastrous situation of the food economy will require granting loans at negative real rates, keeping real deposit rates negative as well. As a result, local deposits will be inadequate to support the volume of credit needed in the food economy. Subsidized credits are

expected to be granted continuously, lowering the effectiveness of their allocation. If the restructuring of the BGZ and the coop banks is too shallow, they will not have a solid financial base from which to operate. Most important will be the managerial techniques, personnel management, and overall incentive structures that develop.

Highlights of Recent ERS Farm Financial Reports

Commercial Hog Farms: Financial and Structural Characteristics, 1987-91, by Robert McElroy and Charles Dodson. ERS Agricultural Information Bulletin No. 700, May 1994. Abstract: Commercial hog farms in 1987-91 had an average inventory of 2,000 hogs and operated 400 acres, according to the USDA's Farm Costs and Returns Survey. Average net farm income ranged from \$23,410 per farm in 1988 to \$48,162 in 1990. The average operation's equity position improved each year and 72 percent of all operations were profitable in 1991.

The Relation of Farm Size and Government Programme Benefits: An Application of Data Envelopment Analysis to Policy Evaluation, by Gerald Whittaker. In *Applied Economics*, 1994. Vol. 26, pp 469-478. Abstract: Data envelopment analysis is used to establish comparisons of maximum profit without and with participation in Government programs. A measure of a farm's ability to survive, returns on equity, is used to measure the benefit received from participation in Government programs. Density functions are estimated with kernel density estimation using bootstrap samples, and weighted regressions are used to test the equality of mean benefits between different size groups. The results indicate that almost all farms that could be considered of commercial size receive the same benefit from participation in Government programs.

Profitability of Farm Businesses: A Regional, Farm Type, and Size Analysis. By Charles B. Dodson. ERS Agricultural Information Bulletin No. 884, June 1994. Abstract: Detailed information is given on farm business profits during 1987-91 among the various U.S. production regions, production specialties, and farm sizes. The report uses recent data to show the wide income variance among farms, a third of which are not profitable, and shows the major part played by larger and more specialized farms in the production of U.S. agriculture. Average returns on assets including capital gains are determined for farms of the various regions, production specialties, and farm sizes. Farm incomes are compared against the returns of U.S. Treasury bills on the same value of capital investment.

Characteristics and Production Costs of U.S. Corn Farms, 1991. By William D. McBride. ERS Statistical Bulletin 691, January 1994. The average variable cash cost of producing a bushel of corn was \$1.25 for producers surveyed in the 1991 Farm Costs and Returns Survey. Individual farm costs ranged from about \$0.40 to more than \$8 per bushel. Regional differences in production practices and growing conditions had the greatest influence on production costs. Corn growers in the North Central and Plains regions had a significant cost advantage over producers in the Northeast and Southeast. Dry weather reduced yield and resulted in abnormally high per-bushel costs in the Northeast. Nearly 70

percent of Northeast producers and more than half of Southeast producers were high-cost corn growers in 1991.

Soybeans: State-Level Production Costs, Characteristics, and Input Use, 1990. By Mir B. Ali and William D. McBride. ERS Statistical Bulletin No. 873, February 1994. Abstract: This report presents State-level soybean production cost and return estimates for the 1990 production year, along with coefficients of variation for each cost item. Per-acre costs are highly variable among States due to difference in production practices, inputs, and type and size of machines used in soybean production. Total per-acre economic costs varied from \$151 in Mississippi to \$258 in Nebraska. Soybean yields varied significantly, from about 10 bushels in Georgia to 43 bushels per planted acre in Indiana.

Effects of Government Programs on Corn Production Costs and Returns, 1991 and 1992. By William D. McBride. ERS Agricultural Information Bulletin No. 701, June 1994. Abstract: Gross value of production, production costs, and net returns are all higher when the direct effects of Government programs are incorporated into corn cost and return estimates. Government programs raised net returns after cash expenses by \$24 per planted acre in 1991. Greater yields and higher deficiency payments in 1992 added nearly \$44 to net cash returns. North Central and Plains corn growers are most affected by Government programs since they participate to a much greater extent in the programs than growers in the Southeast and Northeast. Producer participation and annual price and yield conditions have the greatest influence on the extent to which Government programs enhance returns to corn production.

Effects of Government Programs on Sorghum Production Costs and Returns, 1990. By Nora L. Brooks. ERS Agricultural Information Bulletin No. 689, December 1993. Abstract: Net returns after cash expenses increase from \$22.27 to \$43.27 per planted acre of grain sorghum in 1990 when the direct effects of programs are included in the estimates, and net returns after cash expenses and capital replacement costs increase from -\$0.48 to \$18.69. Total cash expenses increase from \$95.03 to \$99.86 per planted acre, and economic costs from \$164.15 to \$174.07. Generally, 70 percent of sorghum producers participate in Government programs. Program participants must put some of their land (10 percent in 1990) into conserving-use acres and must incur costs to plant at least half the set-aside acreage in an annual or perennial cover, except in arid areas.

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Appendix table 1--Farm income statements, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Cash income statement					
1. Cash receipts	170.0	168.8	171.2	175.1	177 to 185
Crops 1/	80.1	82.1	84.9	84.5	88 to 92
Livestock	89.8	86.7	86.3	90.6	89 to 93
2. Direct Government payments	9.3	8.2	9.2	13.4	8 to 10
3. Farm-related income 2/	7.6	7.8	7.8	8.8	7 to 9
4. Gross cash income (1+2+3)	186.8	184.9	188.2	197.2	194 to 202
5. Cash expenses 3/	131.8	131.7	130.8	138.7	139 to 145
6. NET CASH INCOME (4-5)	55.1	53.2	57.4	58.5	53 to 57
Deflated (1987\$) 4/	49.4	45.2	47.7	47.1	42 to 45
Farm income statement					
7. Gross cash income (1+2+3)	186.8	184.9	188.2	197.2	194 to 202
8. Nonmoney income 5/	8.0	7.7	7.8	7.9	7 to 9
9. Inventory adjustment	3.4	-.3	4.3	-3.6	4 to 6
10. Total gross income (7+8+9)	198.2	192.3	200.2	201.4	207 to 215
11. Total expenses	151.3	151.2	150.1	158.0	159 to 165
12. NET FARM INCOME (10-11)	46.9	41.1	50.1	43.4	47 to 51
Deflated (1987\$) 4/	41.1	34.9	41.5	34.9	37 to 41

F = forecast. Totals may not add due to rounding.

1/ Includes CCC loans. 2/ Income from machine hire and customwork, forest product sales, custom feeding service fees, and other farm sources. 3/ Excludes expenses for onfarm operator dwellings and noncash items such as capital consumption and perquisites to hired labor. 4/ Deflated by the GDP implicit price deflator. 5/ Includes the value of home consumption of farm products plus imputed rental value of operator dwellings.

Appendix table 2--Average income to farm operator households, 1990-94 1/

Item	1990	1991	1992	1993	1994F
Dollars per operator household					
Farm operator household income	39,007	37,447	42,911	38,300	39,900 to 43,400
Farm income 2/	5,742 3/	5,810	7,180	5,125	4,300 to 5,900
Self-employment	4,973	4,458	5,172	4,710	n/a
Other	768	1,352	2,008	415	n/a
Off-farm income	33,265	31,638	35,731	33,176	35,500 to 37,500
Wages, salaries, and					
non-farm businesses	24,778	23,551	27,022	23,868	n/a
Interest, dividends,					
transfer payments, etc.	8,487	8,087	8,709	9,308	n/a

F = forecast. n/a = not available. Totals may not add due to rounding.

1/ Data for 1990 are expanded to represent the farm operator households surveyed in the Farm Costs and Returns Survey. Data for 1991-92 are expanded to represent the number of U.S. farms and ranches. 2/ Includes self-employment income, wages that operators pay themselves and family members to work on the farm, income from renting farmland, and net income from another farm business. 3/ If the additional 350,000 small farms included in the 1991 analysis were included in the 1990 analysis, the 1990 farm income to the household would be approximately \$4,600.

Appendix table 3--Relationship of net cash to net farm income, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Gross cash income	186.8	184.9	188.2	197.2	194 to 202
Minus cash expenses	130.9	131.7	130.8	138.7	139 to 145
Equals net cash income	55.7	53.2	57.4	58.5	53 to 57
Plus nonmoney income 1/	6.2	7.7	7.8	7.9	7 to 9
Plus value of inventory change	3.4	.3	4.3	-3.6	4 to 6
Minus noncash expenses	15.4	15.4	15.2	15.3	15 to 16
Labor perquisites	.5	.6	.5	0.4	0 to 1
Net capital consumption	14.9	14.9	14.7	14.9	15 to 16
Capital consumption exc. dwellings	16.3	16.3	16.1	16.3	16 to 17
- Landlord capital consumption	1.4	1.4	1.4	1.4	1 to 2
Minus operator dwelling expenses	4.1	4.0	4.1	4.0	3 to 5
Capital consumption	2.0	1.9	2.2	2.1	1 to 2
Interest	.6	.7	.6	.5	0 to 1
Property taxes	.6	.6	.6	.7	0 to 1
Repair and maintenance	.6	.7	.6	.5	0 to 1
Insurance	.2	.2	.2	.2	0 to 1
Equals net farm income	46.9	41.1	50.1	43.4	47 to 51

F = forecast.

1/ The value of home consumption and gross rental value of all dwellings.

Appendix table 4--Cash receipts, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Crop receipts 1/	80.1	82.1	84.9	84.5	88 to 92
Food grains	7.5	7.4	8.5	8.2	8 to 11
Wheat	6.4	6.3	7.2	7.4	7 to 9
Rice	1.1	1.1	1.2	.8	1 to 2
Feed grains and hay	18.7	19.5	19.8	19.3	18 to 22
Corn	13.3	14.4	14.5	14.0	13 to 16
Sorghum, barley, and oats	2.0	2.1	2.3	2.1	1 to 3
Oil crops	12.3	12.7	13.3	13.0	12 to 16
Soybeans	10.8	11.0	11.6	11.6	11 to 14
Peanuts	1.3	1.4	1.3	1.0	1 to 2
Cotton lint and seed	5.5	5.2	5.2	5.0	5 to 7
Tobacco	2.7	2.9	3.0	2.9	2 to 3
Fruits and nuts	9.4	9.8	10.1	9.9	10 to 12
Vegetables	11.6	11.6	11.8	12.7	12 to 14
Greenhouse & nursery	8.5	8.9	9.1	9.3	9 to 10
Livestock receipts 2/	89.8	86.7	86.3	90.6	89 to 93
Red meats	51.9	51.1	48.4	51.4	48 to 52
Cattle and calves	39.9	39.6	37.9	40.0	38 to 43
Hogs	11.6	11.0	10.1	10.9	9 to 11
Sheep and lambs	0.4	0.4	0.5	0.5	0 to 1
Poultry and eggs	15.2	15.1	15.5	17.2	16 to 19
Broilers	8.4	8.4	9.2	10.4	10 to 12
Turkeys	2.4	2.3	2.3	2.4	2 to 3
Eggs	4.0	3.9	3.4	3.8	3 to 4
Dairy products	20.1	18.0	19.8	19.3	19 to 21
TOTAL RECEIPTS	170.0	168.8	171.2	175.1	177 to 185

F = forecast. * = less than \$500 million. Totals may not add due to rounding.

1/ Includes sugar, seed, and other miscellaneous crops. 2/ Includes miscellaneous livestock and livestock products.

Appendix table 5--Farm production expenses, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Farm-origin	39.7	38.7	38.9	41.5	40 to 44
Feed	20.4	19.3	20.1	21.4	21 to 24
Feeder livestock	14.8	14.3	13.9	14.9	13 to 15
Seed	4.5	5.1	4.9	5.2	5 to 6
Manufactured inputs	22.0	23.2	22.7	23.2	21 to 25
Fertilizer and lime	8.2	8.7	8.3	8.4	8 to 9
Fuels and oils	5.8	5.6	5.3	5.4	5 to 6
Electricity	2.6	2.6	2.6	2.7	2 to 3
Pesticides	5.4	6.3	6.5	6.7	6 to 8
Interest	13.4	12.1	11.2	10.8	10 to 12
Nonreal estate	6.7	6.0	5.4	5.3	5 to 6
Real estate	6.7	6.1	5.8	5.5	5 to 6
Other operating expenses	43.1	44.4	43.7	48.3	48 to 52
Repair and maintenance	8.6	8.6	8.5	9.2	9 to 10
Labor	14.1	14.0	14.0	15.0	14 to 16
Machine hire and customwork	3.5	3.5	3.8	4.4	4 to 5
Animal health	1.5	1.4	1.7	2.0	1 to 3
Marketing, storage & transportation	4.2	4.7	4.5	5.6	6 to 7
Miscellaneous	11.2	12.3	11.4	12.2	11 to 13
Other overhead expenses	33.0	32.8	33.7	34.4	34 to 36
Capital consumption	18.2	18.2	18.3	18.4	18 to 19
Property taxes	5.7	5.6	5.8	6.3	6 to 7
Net rent to nonoperator landlords	9.0	8.9	9.5	9.6	9 to 11
Total production expenses	151.3	151.2	150.1	158.0	159 to 165
Noncash expenses	15.4	15.4	15.2	15.3	15 to 16
Labor perquisites	.5	.6	.5	.4	0 to 1
Net capital consumption	14.9	14.9	14.7	14.9	15 to 16
Capital consumption exc. dwellings	16.3	16.3	16.1	16.3	16 to 17
- Landlord capital consumption	1.4	1.4	1.4	1.4	1 to 2
Operator dwelling expenses	4.1	4.0	4.1	4.0	3 to 5
Capital consumption	2.0	1.9	2.2	2.1	1 to 2
Interest	.6	.7	.6	.5	0 to 1
Property taxes	.6	.6	.6	.7	0 to 1
Repair and maintenance	.6	.7	.6	.5	0 to 1
Insurance	.2	.2	.2	.2	0 to 1
Cash expenses 1/	131.8	131.7	130.8	138.7	139 to 145

F = forecast.

1/ Total production expenses minus noncash and onfarm operator dwelling expenses.

Appendix table 6--Farm income distribution by selected enterprise type, 1992-94 1/

Item	Total	Crops			Fruit/nut/vegetable	Total	Livestock					
		Cash grain 2/	Cotton				Red meat	Poultry	Dairy			
Income:												
Cash receipts--												
Crops					Billion dollars							
1992	79.0	31.6	4.1	19.3		5.8	4.5	0.1	0.8			
1993	77.2	29.6	4.5	20.5		6.2	4.8	0.1	.9			
1994	83	32	5	22		7	5	*	1			
Livestock												
1992	6.3	4.3	0.1	0.2		80.1	39.9	15.4	21.8			
1993	6.5	4.6	0.1	0.2		83.6	42.3	17.2	21.3			
1994	6	4	*	*		85	42	18	22			
Direct Government payments												
1992	11.1	4.8	.8	0.2		3.1	1.8	*	.5			
1993	9.6	6.7	.8	0.2		3.8	3.1	*	.5			
1994	6	4	*	*		2	2	*	*			
Gross cash income-- 3/												
1992	96.5	43.1	5.2	20.3		91.4	48.2	15.7	23.6			
1993	96.6	42.5	5.5	21.4		97.8	52.5	17.4	23.4			
1994	99	42	6	23		99	51	18	24			
Cash expenses--												
1992	61.4	28.8	3.4	11.7		68.8	38.4	9.1	17.9			
1993	66.6	29.3	3.9	14.3		76.1	44.0	9.6	19.3			
1994	69	30	4	15		78	45	10	20			
Net cash income--												
Current dollars 4/												
1992	35.1	14.3	1.8	8.6		22.7	9.8	6.6	5.7			
1993	30.0	13.2	1.7	7.0		21.6	8.5	7.8	4.1			
1994	31	12	2	8		20	6	8	4			
Deflated (\$1987)												
1992	29.0	11.9	1.5	7.1		18.8	8.1	5.4	4.7			
1993	24.1	10.6	1.3	5.7		17.4	6.8	6.3	3.3			
1994	24	9	2	7		16	5	7	3			

Figures for 1993 are preliminary and 1994 are forecast. *-less than \$500 million. Numbers are rounded.

1/ Farm types are defined as those with 50 percent or more of the value of production accounted for by a specific commodity or commodity group. 2/ Includes farms earning at least half their receipts from sales of wheat, corn, soybeans, rice, sorghum, barley, oats, or a mix of cash grains. 3/ Cash receipts plus government payments plus farm-related income. 4/ Gross cash income minus cash expenses.

Appendix table 7--Value added by the agricultural sector, 1990-94 1/

Item	1990	1991	1992	1993	1994F
Billion dollars					
Crop output	83.2	81.2	88.6	80	79 to 83
Cash receipts	80.1	82.1	84.9	84	85 to 89
Home consumption	.1	.1	.1	*	0 to 1
Value of inventory adjustment	2.9	-1.0	3.6	-4	3 to 8
Livestock and poultry output	90.8	87.9	87.5	92	90 to 92
Cash receipts	89.3	86.7	86.4	91	90 to 93
Home consumption	.5	.5	.5	1	0 to 1
Value of inventory adjustment	.5	.7	.6	1	0 to 2
Services and forestry	14.8	15.0	15.0	16	15 to 17
Machine and customwork	1.8	1.7	1.5	2	2 to 3
Forest products sold	2.3	2.3	2.6	3	2 to 3
Other farm-related income	3.5	3.8	3.4	4	3 to 4
Gross rental value of farm dwellings	7.3	7.1	7.2	7	7 to 9
Equal: Agricultural sector output	188.9	184.1	191.4	188	197 to 201
Less: Intermediate consumption outlays	92.0	93.6	92.7	99	95 to 99
Farm origin	39.7	38.7	38.9	42	40 to 44
Feed purchased	20.4	19.3	20.1	21	21 to 24
Livestock and poultry purchased	14.8	14.3	13.9	15	13 to 15
Seed purchased	4.5	5.1	4.9	5	5 to 6
Manufactured inputs	22.0	23.2	22.7	23	21 to 25
Fertilizer and lime	8.2	8.7	8.3	8	8 to 9
Pesticides	5.4	6.3	6.5	7	6 to 8
Fuel and oils	5.8	5.6	5.3	5	5 to 6
Electricity	2.6	2.6	2.6	3	2 to 3
Other	30.3	31.7	31.1	35	30 to 35
Repair and maintenance	8.6	8.6	8.5	9	9 to 10
Machine hire and customwork	3.6	3.5	3.8	4	4 to 5
Marketing, storage, and transportation	4.2	4.7	4.5	6	6 to 7
Contract labor	1.6	1.6	1.8	2	2 to 3
Miscellaneous	12.4	13.1	12.5	14	12 to 15
Plus: Net Government transactions	3.2	2.3	3.0	7	2 to 4
+ Direct Government Payments	9.3	8.2	9.2	13	8 to 10
- Vehicle registration and licensing fees	0.4	0.3	0.4	*	0 to 1
- Property taxes	5.7	5.6	5.8	6	6 to 7
Equal: Gross value added	100.1	92.7	101.3	95	102 to 107
Less: Capital consumption	18.3	18.2	18.3	18	18 to 20
Equal: NET VALUE ADDED	81.9	74.5	83.0	77	82 to 88

F = forecast. * = less than 0.5 million. n/a = not available.

1/ Components are from the farm income accounts and include income and expenses related to farm operator dwellings. The concept is consistent with that employed by the Organization for Economic Cooperation and Development.

Appendix table 8--Farm income and returns, farm business balance sheet, and rates of return, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Income and total returns:					
1. Gross farm income 1/	191	186	194	193	203 to 207
2. Wages and perquisites to hired labor	13	13	12	13	12 to 14
3. Other operating expenses, excluding interest	96	98	97	99	100 to 104
4. Capital consumption	16	16	16	16	16 to 18
5. Net income from assets and operators' labor and management (1-2-3-4) 2/	67	59	69	60	67 to 71
6. Income imputed to operators' labor and management	30	32	32	33	32 to 36
7. Residual income to farm assets (5-6)	37	28	37	22	37 to 41
8. Real capital gains on assets	-21	-33	-8	6	3 to 7
9. Total return to assets (7+8)	16	-6	29	28	42 to 46
10. Interest paid	13	11	11	10	10 to 12
11. Real capital gains on debt	7	6	4	4	3 to 5
12. Total return to equity (9-10+11)	10	-11	23	21	32 to 36
13. Real capital gains on equity (8+11)	-14	-28	-3	10	7 to 11
14. Residual income to farm equity (12-13)	25	16	26	16	23 to 27
Balance sheet:					
15. Assets	848	842	861	886	915 to 925
16. Debt	137	139	139	142	141 to 145
17. Equity (15-16)	711	703	722	746	771 to 781
Percent					
Rates of return and interest rates:					
18. Rate of return on assets (7/15)	4.4	3.3	4.3	3.0	3 to 5
19. Real capital gain on assets (8/15)	-2.5	-4.0	-0.9	.7	0 to 1
20. Total real return on assets (18+19)	1.9	-0.7	3.4	3.1	4 to 5
21. Average interest rate paid on debt (10/16)	9.3	8.3	7.7	7.3	7 to 8
22. Real capital gains on debt (11/16)	5.0	4.1	3.2	2.6	2 to 3
23. Real cost of debt (21-22)	4.3	4.2	4.5	4.7	4 to 6
24. Rate of return on equity ((7-10)/17)	3.4	2.3	3.6	2.2	2 to 4
25. Real capital gain on equity ((8+11)/17)	-3.9	-5.6	-1.7	.3	0 to 1
26. Total real return on equity (24+25)	-0.5	-3.3	2.0	2.5	3 to 4
27. Net return on assets (18-21)	-4.9	-5.0	-3.4	-4.2	-4 to -3
28. Real net return on assets (20-23) 3/	-2.4	-4.8	-1.1	-1.0	-1 to 0

F = forecast. Numbers may not add due to rounding.

1/ Excludes operator dwellings. 2/ Numbers in parentheses show components required to calculate the item.
3/ When the total real rate of return on assets exceeds total real cost of debt, debt financing is advantageous.

Appendix table 9--Farm business balance sheet, 1990-94

Item	1990	1991	1992	1993	1994F
Billion dollars					
Farm assets	848.3	842.2	861.2	886	915 to 925
Real estate	628.2	623.2	633.1	656	677 to 687
Livestock and poultry	70.9	68.1	71.3	72	72 to 76
Machinery and motor vehicles	85.4	85.8	85.6	85	86 to 90
Crops stored 1/	22.8	22.0	24.1	23	24 to 28
Purchased inputs	2.8	2.6	3.9	4	2 to 4
Financial assets	38.3	40.6	43.4	45	45 to 49
Farm debt	137.4	138.9	139.3	142	141 to 145
Real estate 2/	74.1	74.6	75.6	76	75 to 79
Nonreal estate	63.2	64.3	63.6	66	64 to 68
Farm equity	710.9	703.4	721.9	744	771 to 781
Ratio					
Selected ratios:					
Debt-to-asset	16.2	16.5	16.2	16	15 to 17
Debt-to-equity	19.3	19.7	19.3	19	18 to 20
Debt-to-net cash income	245.8	260.4	245.3	247	260 to 270

F = forecast.

1/ Value of non-CCC crops held on farm plus value above loan rate for crops held under CCC storage and drying facility loans.

Appendix table 10--Selected farm financial ratios, 1990-94

Ratios	1990	1991	1992	1993	1994F
Ratio					
Liquidity ratios:					
Farm business debt service coverage 1/	2.37	2.46	2.49	2.5	2.3 to 2.5
Debt servicing 2/	.15	.15	.14	.1	0 to .2
Times interest earned ratio 3/	4.47	4.31	4.36	3.9	4.3 to 4.5
Percent					
Solvency ratios:					
Debt/asset 4/	16.2	16.5	16.2	16.0	15 to 17
Debt/equity 5/	19.3	19.7	19.3	19.1	18 to 20
Profitability ratios:					
Return on equity 6/	3.5	2.3	3.5	2.2	2 to 4
Return on assets 7/	4.5	3.3	4.2	3.0	3 to 5
Net farm to gross cash farm income 8/	24.9	21.3	25.8	24.2	26 to 28
Financial efficiency ratios:					
Gross ratio 9/	70.2	69.7	68.7	70.0	69 to 73
Interest to gross cash farm income 10/	6.8	6.1	5.8	5.9	5 to 7
Asset turnover 11/	22.3	22.3	22.1	20.0	19 to 21
Net cash farm income to debt ratio 12/	43.1	37.3	42.8	37.4	40 to 44
Financial leverage index 13/	.79	.70	.84	.73	.8 to .9

F = forecast.

1/ Assesses the ability of farm businesses to pay principal and interest. 2/ Indicates the proportion of gross cash farm income needed to service debt. 3/ Shows the farm sector's ability to service debt out of net income. 4/ Measures debt pledged against farm assets. Ratio indicates degree of financial risk. 5/ Measures the relative proportion of funds provided by creditors (debt) and owners (equity). 6/ Measures the returns to equity capital employed in the farm business from current income. Measures how efficiently farm business assets are used. 7/ Measures how efficiently managers use farm assets. 8/ The profit margin indicates profits earned per dollar of gross income. 9/ Gives the portion of gross cash farm income absorbed by production expenses (claims on farm businesses). 10/ Gives the proportion of gross cash farm income committed to interest payments. 11/ Measures the gross farm income generated per dollar of farm business assets. 12/ Indicates the burden placed on net cash farm income to retire outstanding debt. 13/ Indicates whether the use of financial leverage is advantageous.

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